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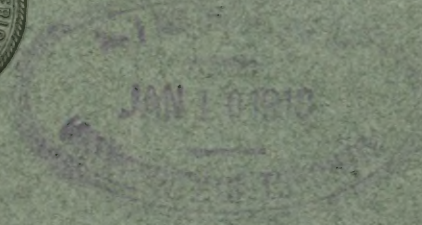
BUREAU OF MINES

VAN. H. MANNING, DIRECTOR

COST ACCOUNTING FOR OIL
PRODUCERS

BY

CLARENCE G. SMITH



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

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COST ACCOUNTING FOR OIL PRODUCERS.

By CLARENCE G. SMITH.

INTRODUCTION.

Prior to the actual development of an oil property it is difficult to determine the quantity of oil under the property and the rate at which this oil can be brought to the surface—factors that determine the ultimate value of the property. Consequently, there has been much confusion in devising accounting systems that, during the entire life of a property, will show costs and profits from which the producer can determine whether his property is being worked at a profit or otherwise. The Bureau of Mines publishes this report in recognition of a distinct need for a simple treatise on accounting methods adapted to the peculiarities of the petroleum industry.

Probably many companies operating oil wells are not fully acquainted with details important to the welfare of their business, because their account books fail to furnish them with exact and adequate data.

With the accountant rests the responsibility of providing the management with reports setting forth the details of the business expressed in fitting terms as well as in dollars and cents. These reports are a means whereby efficiency may be maintained, waste prevented, oil obtained and sold, and money suitably reinvested. They also enable a concern to study the progress of its business in order to conserve to the utmost the possible benefits from an exhaustible deposit of mineral wealth. When managements realize the extent of the waste at their properties more attention will be given to the character of the accountancy records.

Herein are presented descriptions and discussions of balance sheets, profit-and-loss statements, and bookkeeping methods peculiarly adapted to the oil business. As far as possible, technical phrases have been omitted in order that those not familiar with accounting terms may be able to follow the subject matter. The systems of keeping books outlined in Chapter X have all been found practical.

For brevity as well as clearness the major part of the work refers to the company operating only one property.

Although some of the terms used by the writer and some of the methods described apply especially to practice in the California fields,

this fact in no wise restricts the application of the accounting systems described, for the writer has recognized that local differences in field practice exist, and has sought to present accounting methods that provide for such differences.

Attention is called to two words, "concern" and "unit", used frequently throughout this report. As a person, a partnership, or a corporation may own and operate oil properties, and as a man may do business under his own name or that of a partnership or corporation, the word "concern" is used herein for convenience to designate the legal entity operating an oil property, whether this entity is a corporation, a partnership, or an individual. The word "unit" signifies any tangible agency, used in connection with the production of oil, that is given a separate account in the books. Thus an oil well, a tank, a pipe line, or a power plant, is a unit. In the method of accounting that the author advocates, each well and each tank is treated as a separate unit.

The term "management" is used in this report to designate the person or persons having supreme charge of the operations of an oil concern. The term "facilities" is used to designate the things or agencies that must be used in producing oil. Thus wells, tanks, draft animals, power plants, and buildings constitute facilities. The term is broader than "unit," as a facility may include an intangible agency such as team rental.

ACKNOWLEDGMENT.

The author wishes to acknowledge with thanks the courtesies extended him by the many representatives of oil companies whom he interviewed and to express his appreciation of their kindness and cooperation.

CHAPTER I.

RELATION OF ACCOUNTANCY METHODS TO FIELD CONDITIONS AND PRACTICE.

NECESSITY OF ADOPTING SUITABLE BOOKKEEPING METHODS.

When the principles of accountancy are applied to any business, the accounts and the bookkeeping methods employed naturally depend on the character of the business; and even though several businesses may be similar in character, the accounting may be varied to suit the conditions peculiar to each when the problems encountered are not uniform. Therefore, in order to plan and carry out the accounts and bookkeeping system best adapted to a particular business, the accountant must study not only local problems but also the details of the business at large.

Generally speaking, the accounts of all oil concerns should be similar insofar as the drilling and the operating of oil wells are the main features of the business. However, the conditions under which wells are drilled and operated are by no means uniform, as they depend largely on the depth of the wells, the character of the various formations encountered in drilling, and the nature of the oil sand itself.

WELL DRILLING UNDER CONTRACT.

Many oil wells are drilled by contractors. The agreements between the oil concern and the contractor provide for settlement with the latter at a certain price per foot drilled, and naturally vary according to the work to be done.

Shallow wells are usually drilled with a portable drilling machine, and the power is generally supplied by a portable boiler. The drilling machine, boiler, drilling tools, pipe-line connections, and labor are customarily furnished by the contractor. The concern furnishes the casing, tubing, rods, pump, connections to pumping plant, lead line, torpedoes, etc. Either the contractor or the concern may supply water and fuel. When the well is down to its final depth the contractor places the casing and erects the pumping machinery, brings the oil to the surface, and turns the well over to the concern for operation; then he moves his outfit away.

For deep wells the same general arrangements prevail, except that a permanent derrick is usually erected, and the boilers are

larger and are stationary. On completing his work the contractor invariably leaves the derrick, and if the well is a success may leave the rig irons, boilers, some of the tools, etc., if the concern wishes to purchase them.

As the contractor furnishes the drilling outfit, the foreman and the crew, and likewise assumes the expense of the machinery upkeep, etc., the oil concern is relieved, particularly if the wells are shallow, of investing in such equipment as is required for drilling only, and the concern's accountant in turn does not have to account for it.

WELL DRILLING BY OPERATING COMPANY.

When the drilling is done by an operating concern, the field superintendent directs the work, and the concern supplies all labor and material.

If the wells are shallow, a portable drilling machine and a portable boiler may be used, and if the formation "stands up" and no troubles are encountered, the drilling is rapid and the drilling tools need not be expensive. Likewise a temporary camp for the crew may suffice. If the underground strata cave, and drilling troubles have to be overcome, a larger investment in tools is demanded, as the first casing for the wells must be several sizes larger in diameter than that with which they are to be finished. The drilling outfit must be more complete and substantial, and as the drillers alternate between drilling ahead, bailing, and working the casing to keep it free, the equipment provided must be more permanent, as a longer time is required for completing a well; also, more fittings are used, as the repairs are more frequent.

Thus, the business of the concern becomes more complex, as the concern does the work of the contractor, and the accounting becomes correspondingly more complicated.

OPERATION OF OIL WELLS.

Wells drilled in ground that does not cave are generally the least troublesome to operate. Such wells are usually pumped with a "pumping power,"^a horses being used for the cleaning-out jobs. Redrilling in such ground is seldom necessary. When wells are drilled in formations that cave, the oil stratum is apt to be soft and shifting. Under these conditions, the sand may run into the hole, or may be sucked in by too rapid pumping, necessitating occasional cleaning and redrilling in order to keep the well producing. Steam power is generally used for this kind of work, and the wells, especially deep wells, are pumped with steam from a boiler plant. Frequently one boiler plant supplies the wells being operated, as well as those being

^a Pumping jacks driven by a gas engine.

drilled. Then the cost of operating the boiler plant must be prorated to each kind of work. The superintendent supervises the various branches of the work in the field, and his services and those of his assistants must likewise be prorated to the work they concern. Thus, the character of the accounting is influenced by the features encountered in operating a property.

The books of account represent the financial history of a business; therefore the accounts they contain should be correctly expressed, in order that the compilation of exhibits may show the true condition and progress of the business. The proper grouping of accounts on exhibits is equally important. As the worth of the assets is largely dependent on the oil content of the property, the accounts should be arranged so that the cost of the assets and their depreciation or depletion may be indicated as clearly as practicable.

CHAPTER II.

BALANCE SHEET APPLICABLE TO SMALL CONCERNS.

SPECIMEN BALANCE SHEET.

The balance sheet is the exhibit toward which the accountant works. On the page opposite is presented a balance sheet applicable to small oil concerns, together with a description of the nature of the charge that should be made to each account represented therein.

DISCUSSION OF ACCOUNTS IN BALANCE SHEET.

REAL ESTATE.^a

To this account should be charged the cost to the concern of its oil property. If the property is owned in fee simple, then the account should clearly indicate that fact, as shown—"Real estate (owned in fee)." If the property is an oil lease, then the account should be styled "Oil leases," "Leasehold rights," or some similar title.

If the property is owned in fee simple, to the account should be charged (a) its cost to the concern, whether this cost be in cash, stock issue, or exchange, and (b) the cost of survey, expense accounts incurred for the purpose of acquiring the property, expert's fees for reports on the property before its acquirement, delinquent taxes up to date of acquirement,^a bonus paid to hold property (if the bonus is not treated as a part of the purchase price), and legal expenses, notary and recording fees, abstract of title, etc.

If the property is an oil lease, to the account should be charged (1) the bonus paid to obtain the lease and (2) such part of the items enumerated under *b* above as are pertinent.

OFFICE EQUIPMENT.

To "Office equipment" should be charged the cost of such items as desks, chairs, tables, safes, counter, carpets, linoleum, desk lights, buzzer system, and private telephone systems placed in the administrative office. Transportation charges and expenses incurred in connection with putting the equipment in place are also chargeable to this account.

^a It is permissible to charge taxes up to date of production to "Real estate."

Specimen balance sheet for a small oil company.

PROGRESSIVE OIL CO.

BALANCE SHEET, JUNE 30, 1918.

Assets.		Liabilities.	
Capital assets:		Capital liabilities:	
Real estate owned in fee.....	\$112,376.20	Capital account <i>b</i>	\$28,000.00
Office equipment <i>a</i>	85.27		
Plant:			
Oil wells.....	\$25,310.86		
Tanks.....	4,200.00		
Power plants.....	1,500.00		
Buildings.....	2,806.32		
Building equipment.....	506.00		
Pipeline.....	800.42		
Live stock and vehicles.....	250.00		
Tools.....	1,212.16		
	45,088.16		
	<u>177,499.63</u>		
	42,581.18		
	\$135,118.45		
Current assets:		Current liabilities:	
Account receivable.....	11,201.75	Accounts payable.....	\$40.40
Notes receivable.....	100.00	Unpaid taxes.....	1,000.00
Oil in stock.....	175.65	Payable for.....	
Warehouses.....	12.31		
Inventory.....	68.44		
Cash.....	577.91	Sum of June 31, 1917.....	6,272.94
With agent.....	5,000.00	Wain, mortgage.....	10,000.00
With balance.....	15,000.00		
	<u>43,000.00</u>		
	135,118.45		

a Purchased on credit.

b Purchased on credit, returned to bank on credit.

c May be shown on balance sheet in one item, subject, however, must carry in detail accounts.

EQUIPMENT—GENERAL.

Equipment accounts should include all costs in labor and material up to the point of the operating of the oil well under construction.^a If operation begins before the well is completed, then both investment and operating accounts may be charged during that period.

The detailed balance sheet sets forth the concern's investment in each class of asset. Thus, the aggregate of oil-well costs is expressed as "Oil wells;" of the tank costs as "Tanks." When each unit of each class is constructed, it should be numbered or individualized and its construction cost carried in the records under that number. This feature is discussed in a subsequent section, entitled "Books and methods for recording costs of equipment units" (see pp. 97 to 99).

OIL WELLS.

The cost of an oil well includes all expenditures made for it until it is finished. A well may be turned over for operation before it is completed and investment charges may continue after production is obtained therefrom. Well numbers should be specified in the data supporting each charge against this account.

When the well is drilled by a contractor, to this account should be charged the price paid the contractor, and also the following items if supplied by the concern:

The value of the casing in the hole, and of that ruined or damaged during the drilling, whether in the hole or not; first torpedo and expenses in connection with its use; tubing, rods, pump, pumping-jack,^b casing head, and lead line from casing head to the tank or sump receiving the well's production; gas engine if at well site; permanent mast or derrick if one is erected over the well; and labor in cleaning up around the well following its completion, and in connecting the well with its tank or sump.

When the concern itself drills the wells, to the account should be charged the cost of labor and material in preparing to drill, drilling, and finishing each well. This would include such charges as the preliminary well expenses, lumber for the rig, rig irons, cables, engine, belt, circulator, labor employed in drilling, material put in the hole or consumed in drilling, tools lost, worn out, or replaced,^c oils, grease, packing, and sundries, together with a pro rata part of such "clearing accounts"^d as may affect it; also casing, tubing, rods, pumps, lead line, etc. If a completed well is stripped of the machinery not required for its operation the well-investment account should be allowed due credit. The expense of dismantling the drill-

^a Labor and material costs of certain kinds are included in "Clearing accounts," discussed on pages 48-51.

^b Power-plant investment begins with the connection of the pumping strand or the rods to the well-jack or the connection of steam lines to the engine.

^c See p. 72.

^d See pp. 45-51.

ing rig and other equipment and of hauling them to the tool racks or warehouse and the expense of cleaning up around the rig after the completion of the well are chargeable to this account.

DEEPENING OIL WELLS.

Oil wells are means of reaching oil in underground formations and conveying it to the surface. They should be considered completed when they are successfully draining the formation desired to be drained and are equipped for that work. During the drilling, strata of promise may have been cased off, or the casing at the depth of such strata may have been left unperforated either because of the desire of the company to drain other strata thought to be more prolific or on account of threatened boundary wells. Later work may disclose lower sands, unsuspected by the concern at the time the well was first drilled.

All work done on old wells for the purpose of gaining production from strata not being drained by them is in the nature of an investment, and the well's investment account should be charged with the costs. The well investment should be increased whether or not the gain in production warrants the expenditure.

Expenditure on wells once considered completed, whether for plugging them off or for deepening them for other reasons than to attack new oil strata, is chargeable to an operating account.

TANKS.

To the "Tanks" account should be charged the cost to the company of its tanks. Tank numbers should be specified in the data supporting each charge. The account therefore should include the cost of each tank, its freight, teaming to tank site, grading, foundations, tank cover, painting, strapping and the resulting gage chart, labor of erection, cleaning up after completion, etc. Tools lost, worn out, or broken during construction are chargeable to the cost of the tank. Such tools would, of course, be small and relatively unimportant. Pipe lines running to and from tanks are not a part of tank equipment. If tanks are not erected under contract, a part of such "clearing accounts" as are involved is chargeable to each tank.

POWER PLANTS.

To "Power plants" should be charged the cost to the concern of its power plants. Plant numbers should be specified in the data regarding each charge. Both power stations and boiler plants should come under this head.

POWER STATIONS.

Charges under "Power stations" should include the cost of grading, foundation, gas engine, belting, power, initial pumping strand or

rods, shackles, stone boats, swings, and tripods or posts to keep the strand or rods free from the ground or from encumbrance; also the cost of the labor required for the initial installation of all of the equipment mentioned and the freight and teaming costs. If the equipment is not erected under contract, a proportion of such "clearing accounts" as are involved is chargeable to each power station.

BOILER PLANTS.

Charges under "Boiler plants" should include the cost of the grading, foundation, and bricking up, as well as the cost of boilers, feed pump in boiler room, steam lines connected to the plant, the labor cost of erection, and the freight and teaming. One or more boilers may constitute a boiler station. If the boilers are not erected under contract, a proportion of such "clearing accounts" as are involved is chargeable to each boiler plant.

BUILDINGS.

To the "Buildings" account should be charged the cost to the concern of the structures erected on its property. The buildings should be numbered as erected and their numbers should be specified in the data regarding each charge. The costs should include grading, foundation, lumber, painting, teaming, freight, etc., also the labor cost of construction. Outhouses should be charged to the building nearest to them; the water trough and the corral should be charged to the barn. Each structure when erected should be charged to this account regardless of the purpose it serves. If the buildings are not erected under contract, a proportion of such "clearing accounts" as are involved is chargeable to each building.

BUILDING EQUIPMENT.

To the "Building equipment" account should be charged the cost of furniture and fixtures placed in structures at the oil property. The office building would include desks, tables, chairs, safes, files, typewriter, and stove. The cookhouse would include the stove, sinks, tables, benches, dishes, pans, kettles, ice box, meat safe, etc. The cottages would include the bathtub, sink connection, beds, springs, mattresses, chairs, stoves, and other furniture provided by the concern.

PIPE LINES.

To the "Pipe lines" account should be charged the cost of laying the lines, whether intended for oil, water, or gas. If pumps are required to force any of these through the line, then the cost of the pump, including freight, teaming, and installation, is chargeable to "Pipe lines." This account also includes the cost of the pipe used in the line or damaged in its construction, the labor of connecting it,

the cost of trench work if the pipe is buried, and the value of tools and implements broken or lost in the work. If the lines are not constructed under contract, a proportion of such "clearing accounts" as are involved is chargeable to "Pipe lines." Oil lines, water lines, and gas lines often represent a considerable investment, especially where many troubles are met in keeping the wells productive. In this event, and if the lines are likely to be permanent, it is well to use separate accounts for each, such as "Oil lines," "Water lines," and "Gas lines."

LIVE STOCK AND VEHICLES.^a

Charges in the "Live stock and vehicles" account should include the cost of the stock and the rolling stock at the cost price, f. o. b. the property. Horses, mules, wagons, tank wagons, automobiles, auto trucks, buckboards, harness, and the time and expense of the company employees or others in obtaining these are chargeable hereto.

TOOLS.

To this account should be charged the amount expended for tools. Chapter IX (p. 72) deals fully with this subject. Special suggestions both for the concern that has its wells drilled by a contractor and for the concern that drills its own wells are presented.

ACCOUNTS RECEIVABLE.

The title of this account is self-explanatory.

NOTES RECEIVABLE.

The title of this account also is self-explanatory.

OIL IN STORAGE.

The accounting in connection with "Oil in storage" depends upon whether the oil is stored intentionally in anticipation of a higher sales price, future deliveries, etc., or whether it represents merely the unshipped oil left in the shipping tanks and other property tanks or sumps at the close of a month.

As regards stored oil, it may be valued at a price equal to the cost of producing it.^b Insurance premiums and other expenditures connected with the storing of the oil should be added to its value. When the oil is sold, a revenue account should be credited with the difference between the value at which the oil has been carried and the price obtained.

As regards oil left after partial shipments, according to strict accounting theory the same course should be followed. However,

^a Automobiles and other important items can be shown separately if the size of the account warrants this action.

^b "Depreciation and depletion," if calculated by the concern, may be included.

for the reason that the oil may be considered in transit, and because the quantity is not large, this oil may be carried at sales value at the close of each month. If the concern desires to be conservative, the oil in storage at the close of a fiscal year can be carried at a figure approximating the cost of production. Marketing companies customarily lay their pipe lines to the shipping tanks of the producer, and take his oil either on a contract, which stipulates a price per barrel, or on the daily-run basis, paying for the oil at the current market price as quoted by the marketing company. The producer is, therefore, somewhat justified in valuing the unshipped oil at the close of a period at the marketing company's quotation, if he intends to ship it immediately.

When the oil property is operated on a royalty basis, care should be exercised not to include in "Oil in storage" the proportion belonging to the lessor.

Small concerns that sell the oil as fast as it is produced do not as a rule inventory the unshipped oil.

WAREHOUSE.

To the "Warehouse" account should be charged the materials and supplies delivered to the property warehouse for storage until needed. When material is taken out of the warehouse, its value should be charged to the proper account, and "Warehouse" should be relieved of the value.

A stock sheet or card may be used for each size and class of goods purchased, the warehouse intake and outgo being recorded thereon. Inventories should be taken periodically to insure efficiency on the part of the stock clerk, and to minimize shortages at the end of a fiscal year.

The pricing of the outgo may be done by the general office or may be done by the field clerk. The price of any unit should be equal to the invoice price cost plus freight. Materials should always be inventoried at actual purchase price plus freight paid, not the current market price at time of inventory. The transactions of a small concern after the drilling is completed may not be sufficient to warrant a warehouse account and the expense of a clerk to care for it. Further data in connection with the handling of this account are presented on page 63.

INSURANCE UNEXPIRED.

The unexpired parts of insurance-premium costs are generally grouped together on the balance sheet under "Insurance unexpired." The ledger, however, should contain a separate account for each kind of insurance. The two most important are "Fire insurance" and "Compensation insurance."

FIRE INSURANCE

The cost of the premium of each fire insurance policy, when audited, should be charged to "Fire insurance prepaid." The amount of the premium and the period it covers should be recorded in a separate record and each month's pro rata should be charged off monthly. If a policy is canceled and the premium short rated, suitable notation should be made in the separate record so that an adjustment may be made in the following entry.

COMPENSATION INSURANCE.

The cost of compensation insurance can not of course be charged off in equal time installments. The character of the monthly entry is governed by the amount of the pay roll and the rate applicable to the class of work performed.

AGENTS' CREDIT.

It is a common practice for an oil company having its main office away from the oil property to provide the property agent with a revolving fund in order that he may be able to take care of pay-roll advances, emergencies, etc. The agent should render a monthly report acknowledging receipts from the general office and listing the month's disbursements out of the fund. The disbursements should be supported by receipted bills or vouchers. Form 1 shows a printed form suitable for the monthly report.

When the general office audits the cash report, the distribution of the agent's disbursements is worked onto the books under the months in which the payments were made by him. If the company promptly remits to the agent the amount of expenditure shown on the cash report, the size of the fund is not altered and the ledger account representing it does not change.

All permanent or temporary advances to agents of the company which are to be accounted for may be charged to "Agents' credit." A separate ledger page for each agent is advisable. The balance sheet should set forth their aggregate as "Agents' credit." "Agents' credit" is the same as cash to the company.

FORM 1.—Form for "Agents' credit." a

REPORT OF CASH RECEIVED AND DISBURSED.

Month of.....

Date.		Balance on hand per last report..	\$.		
	Receipts:				
			\$.		
		Total to be accounted for..			

Disbursements:

[illegible]

I hereby certify that balance of \$.....,
above set forth, is correct and on hand.

Dated.....

^a Convenient size, 8½ by 11 inches.

CAPITAL ACCOUNT.

The "Capital" account is regulated according to the legal status of the concern—whether an individual, a partnership, or a corporation. The accounting in each instance is governed by commercial law, and is, of course, modified by the agreements between partners if the concern is a partnership and by minute books if it is a corporation.

ACCOUNTS PAYABLE.

"Accounts Payable" is self-explanatory. It represents accounts owing by the oil concern, which are on the books but not necessarily vouchered for payment.

AUDITED VOUCHERS.

The account "Audited vouchers" is credited with the total of the bills, which are taken into account when their distribution is debited. The account "Audited vouchers" is debited when payment is made of the bills so treated. The difference represents the unpaid part. The difference should never be a debit balance.

TAXES ACCRUED.

It is desirable for every concern to prorate its tax expense evenly over each month of the year. This can be done easily when the amount of the tax bill is known in advance. If it is necessary to prorate taxes before the bill has been received, the amount of the yearly tax should be estimated. In either case one-twelfth of the amount should be charged each month to "Taxes"—an operating account. When the charge is made, "Taxes accrued" should be credited. When the tax bills are audited, the amount of the voucher should be charged to "Taxes accrued."

"Taxes accrued" may have either a credit or a debit balance on the ledger. A credit balance should be classified on the balance sheet under current liabilities as "Taxes accrued;" a debit balance should be classified under "Deferred assets" as "Taxes."

CHAPTER III.

BALANCE SHEET FOR LARGE CONCERNS.

SPECIMEN BALANCE SHEET.

The preceding chapter dealt with a balance sheet applicable to the general run of small oil concerns and described each account appearing thereon.

This chapter deals with accounts representing additional assets and liabilities and is of interest mainly to large concerns, although the smaller concerns may have use for some of the accounts described. The additional accounts are designated on the balance sheet by asterisks. A specimen sheet is presented on the page opposite.

DISCUSSION OF ENTRIES ON BALANCE SHEET.

ROADS.

In order to work some properties a roadway must be opened to them. The necessary work may consist of clearing brush, grading, building bridges, etc. The cost of building roads is an asset to the company, being an investment necessary to establish and conduct the business. Roads may join properties, may traverse properties, or may connect a property to the nearest available road. It is, therefore, not always possible to have a road account for each property, if more than one property is worked. Roads are immovable and their value to the concern as a capital asset depends largely on the worth of the properties connected. When a property is abandoned, the value to the concern of a road leading to that property only and through it (if the road is not a thoroughfare to a property beyond) is reduced to salvage value. Oil firms opening new territory or operating in mountainous territory have a decided use for this kind of an account. Only main roads should be charged to the account. Short roads from the main road, when constructed for specific purposes, should be charged to the equipment of the unit they are intended to serve.

To the road account should be charged all construction costs, such as clearing brush, grading, and building culverts and bridges. The cost of powder, fuse, caps, labor, and teaming, and the value of the machinery and tools worn out, lost, or destroyed in the work should also be included in this account. A part of such "clearing accounts" as are involved is chargeable to this account.

Specimen balance sheet for large oil company.^a
PROGRESSIVE OIL CO.

BALANCE SHEET JUNE 30, 1918.

Assets.	Liabilities.
Capital: Real estate (owned in fee)..... \$565,872.10 Office equipment ^b 2,462.65 Plant— Oil wells..... \$215,062.45 Tanks..... 18,924.03 Power plants..... 9,725.67 Buildings..... 23,427.92 Building equipment..... 4,261.43 Oil lines..... 4,726.43 Gas lines..... 3,572.44 Water lines..... 2,162.10 Live stock and vehicles..... 10,461.66 Tools..... 117,682.45 Roads..... 15,000.00 *Telephone system..... 1,265.83 *Electric system..... 2,642.87 *Fire-protection system..... 401.04 *Sewer system..... 2,101.17 *Water system..... 4,628.75 *Reservoirs..... 25,107.32 *Oil, cleaning plant..... 7,641.62 469,158.78 1,037,193.53 Less reserve for depreciation and de- preciation..... 413,722.00 Current assets: Accounts receivable..... 57,625.11 Notes receivable..... 7,624.19 Oil in storage..... 29,147.82 Warehouse..... 5,207.25 *Commissary stocks..... 2,211.85 Insurance unexpired..... Cash..... 1,800.00 With agents..... 3,122.41 With banks..... 6,122.41 712,445.57	Capital— capital account..... \$590,000.00 Current liabilities: Accounts payable..... \$22,117.92 Unfilled orders..... 15,145.71 Taxes accrued..... 4,762.26 60,072.18 Surplus ^c of May 31, 1918..... 172,410.19 of June month of June..... 712,445.57

^a Items preceded by an asterisk are in addition to items shown on specimen balance sheet for a small company. ^b May be shown on balance sheet collectively. The ledger, however, must carry a schedule of each.

TELEPHONE SYSTEM.

When an oil property is situated away from established communities, telephone connection is often difficult to obtain, and the operating concern is frequently forced to run its own line from the property to the telephone company's line. If the concern's operations embrace a large area, it may seem desirable to the company to install a private system connecting the office with the warehouse, shipping tanks, loading racks, mess house, and various property divisions, such as wells being drilled and boilers.

The expenditure involved in the installation of telephone equipment is chargeable to "Telephone system." The cost of clearing brush, and the cost of poles, crossarms, insulators, wire, telephones, gongs, initial batteries, etc., as well as the labor cost is therefore chargeable to this account.

A part of such "clearing accounts" as are involved is chargeable to this account.

Telephone rentals, repairs, renewals, and upkeep of the system are chargeable to an operating account.

ELECTRIC SYSTEM.

Electric lights are used by many concerns to lessen the fire hazard at the oil property. Oil tanks, loading racks, and particularly wells being drilled and those yielding gas should be equipped with electric lights as a protection against the use of open lights. On some large properties a plant is maintained for making gasoline from casing-head gas. To light such a plant electricity must be employed. If a machine shop is maintained, it may also be lighted by electricity.

If electric power is used it may be purchased, or the concern may install an electric plant consisting of gas engine, generator, and accessories, and may generate its own power. Natural gas from the wells or dry gas from the gasoline plant may furnish fuel for the gas engine. Hence the operating cost of the electric plant is relatively small. In addition to the expense of installing the electric plant, the oil concern would have the expense of wiring its property.

To "Electric system," therefore, should be charged the cost of the plant, namely, the cost of grading and foundations, gas engine, generator, belting, circuit breakers, recording gages, accessories, etc., together with the cost of labor for installation. Also, to "Electric system" should be charged the cost in labor and supplies of installing the main lines over the property, and the sockets, switches, initial electric-light bulbs, etc. A part of such "Clearing accounts" as are involved is chargeable to this account.

Wiring of buildings is chargeable to "Buildings"; of oil wells to "Oil wells"; of gasoline plant to "Gasoline plant"; of machine shop to "Machine shop." But wiring of general property units such as

water, fuel, storage and shipping tanks, loading racks, and roadways should be charged to "Electric system."

FIRE-PROTECTION SYSTEM.

The responsibilities of an operating company as regards fire losses increase with the size of its camp, and the establishment of a permanent camp often prompts the company to install its own system to fight fire. To "Fire-protection system" should be charged the cost of fire extinguishers, portable hose carts, plugs to be attached to water lines, and all similar equipment installed for fire protection.

SEWER SYSTEM.

With the establishment of large permanent camps, the outhouses become inadequate and a menace to the health of the community. This eventually leads to the question of sewerage.

When a sewer system is installed, the cost of sewer pipe, septic tank, or cesspool, and the required labor and supplies, freight charges, etc., are chargeable to this account. A part of such "clearing accounts" as are involved is chargeable to this account.

WATER SYSTEM.

Oil concerns often develop their own water supply because the property worked is at some distance from the nearest established water-supply system. Moreover, the local water company may be unable to furnish a sufficient volume of water, or may ask an unreasonable price. The privately developed water system may consist of a bricked-up well, or a well drilled to a depth of a few hundred feet and finished with perforated casing. Often a reservoir is constructed by damming the waters of a creek.

To the account "Water system" should be charged the cost of such installation as is made. If a water well constitutes the system, the account may read "Water well" in lieu of "Water system." A part of such "clearing accounts" as are involved is chargeable to this account.

RESERVOIRS.

To this account should be charged the cost of constructing reservoirs. On the balance sheet they are often classified with tanks under an account styled "Tanks and reservoirs."

OIL-CLEANING OR DEHYDRATING PLANT.

An oil-cleaning or dehydrating plant is required in some operations to separate the oil from the mixture of oil, mud, and water coming from wells being drilled or operated. The mixture is pumped into the plant and treated. The clean oil obtained is pumped into the shipping tanks or the storage tanks to await shipment. Small

proportions of naphtha or distillate may be drawn off during this treatment, and these are generally run into the tank with the clean oil. However, they may be put to other use.

There are many varieties of oil-cleaning plants, requiring various kinds of equipment. To this account should be charged the cost of preliminary work, engineers' fees, blue prints, grading, plant foundations, tanks, machinery, supplies, labor, etc. The cost of testing the plant and the cost of alterations to make it satisfactory are also chargeable to the construction cost. A part of such "clearing accounts" as are involved is chargeable to this account.

The cost of operating the plant may be considered a cost of caring for the oil produced from the well. If a "Storage and shipment" account (see "Profit and loss accounts," p. 22) is used by the company, the operating expense may logically be charged to it.

SUMPS.

On many properties producing heavy oil, the oil is pumped into a sump close to the well side. After the impurities have settled, the clean oil is pumped into tanks. The sump is generally constructed when the well is drilled and its cost should be charged to the cost of the well.

The cost of removing sediment deposits from sumps is a charge against an operating account.

Sumps used as small reservoirs may be carried on the books as an asset, if their size and cost warrant such an entry. However, conservative companies do not treat sumps as assets.

COMMISSARY STOCKS.

The "Commissary stocks" account represents the value of commissary supplies on hand at the close of a period. The account should be debited with the cost of the supplies purchased and stocked, plus the cost of freight, and should be credited with the supplies given out to the cookhouse for its immediate use.

If cookhouses are situated close enough together to enable them to obtain their current needs from a common stock, then only one ledger account termed "Commissary stocks" need be carried. If they are too far distant to permit this arrangement, as many ledger accounts should be carried as there are individual stocks to be accounted for. On the balance sheet the aggregate of the individual stocks may be shown as "Commissary stocks."

A report setting forth the supplies received and given out by each of the individual stock accounts should be compiled monthly. The prices of the supplies represented in this report may be fixed by either the field or the general-office clerk.^a

^a See p. 45.

If small stocks are carried, it is best to charge all purchases direct to the operating account, "Commissary operations."

If sufficient stocks are carried to warrant a "Commissary stocks" account, considerable time and detail may be saved by inventorying the stocks at the close of each period and deducting the total value thereof from the total inventory value at the commencement of the period and the value of the supplies received during it. The difference is, of course, the value of the supplies that have been used. If this system is followed, care must be exercised to reconcile the actual receipts by the cookhouse with the debits to the stock account, so that allowance may be made for supplies not received.

If large general stocks are carried, "Commissary stocks" should be credited with the supplies furnished cookhouses and the cookhouses charged with like amounts.

A great many concerns prefer to rent the cookhouse to a manager to operate it as a boarding house, and thus be relieved of the responsibility of managing it. If this is done, a suitable rate per meal served each employee may be deducted from his pay-roll remittance, and at the end of each working period the aggregate of the deductions may be turned over to the cookhouse manager. When this plan is adopted, the cookhouse manager assumes the operation of the cookhouse, relieving the oil concern of all details connected with the commissary.

CHAPTER IV.

ACCOUNTS SHOWING PROFIT AND LOSS.

NECESSITY FOR STATEMENT SHOWING PROFIT AND LOSS.

Every oil concern should periodically assemble figures representing all earnings and all expenses and should compute therefrom its profit or loss. Each of the accounts representing earnings and expenses may be closed out and the net difference set forth under "Profit and loss," or, if desired, a "Profit and loss" statement may be compiled from the accounts without actually closing them to the "Profit and loss" account.

Profits or losses resulting from certain branches of the business may be carried separately to "Profit and loss," and the "Profit and loss" account for a period may, therefore, be made up of several entries, some of which may be gains and others losses. The net difference between these, in turn, may be carried to "Surplus" ^a and the "Profit and loss" account closed.

Oil concerns must spend money, first, for fixed assets—that is, to get the oil property and to get it equipped, and, secondly, to operate the equipment in order to obtain the oil and to dispose of it. Profit-and-loss expense accounts deal with the operating costs in connection with operation.

Some oil companies do not detail their "Profit and loss" accounts beyond earnings and expenses, each expressed in one lump sum. Others, not content to know merely the amount of profit or loss for a certain period, subdivide the accounts representing earnings and expenses, in order that the details of each earning and expense may be on file as a matter of record. This is a step toward a cost statement. However, detailing may be carried to extremes. It may also fail to present important cost factors. Selection of the best classification is difficult, and each company will doubtless have different needs.

DIFFERENT FORMS OF PROFIT-AND-LOSS STATEMENTS.

The following statements, with the accompanying comments, should be helpful in developing a form satisfactory for any given company.^b

^a Provided the company is a corporation.

^b Administrative and general expenses excepted.

STATEMENT 1 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:	
Oil sales.....	\$11,727.40
Expense:	
Cash expenditures for operations.....	5,210.65
Profit from property operations.....	6,516.75

"Oil sales," as the only account under "Earnings," is not entirely satisfactory from the standpoint of the accountant, in that the net profit is dependent upon the returns from the oil sold. If the company should store the oil for several months and make no sales during that time, the profit-and-loss statement for the period would show a deficit, unless the oil in storage were valued at an amount equal to the cost of procuring it, and an account to represent earnings were credited with a like amount. In this event no profit would be shown during the storing period and an accumulated profit or loss would be shown when the oil was sold. As correct accounting dictates that no profits should be taken on the anticipated sale of stocks, "Oil sales" is a satisfactory entry for the earning account as far as it goes. As explained under "Oil in storage" (p. 11), the small oil producer generally prefers to dispose of his oil as fast as it is obtained, dispensing with the recording on his books of the small volume of unshipped oil left in shipping tanks, well tanks, and sumps at the close of a period. "Oil sales" is an entry favored by the majority of oil producers because of the simplicity of the accounting in connection with its use.

If the operating expense represented in the statement comprises the cash paid out, the statement of production costs is governed by the period in which they are paid. As the period of payment is not an index to the period in which the expense is incurred, the entry "Cash expenditures for operations" is clearly neither suitable to express a month's operating expenses, nor a satisfactory reference from which to study comparative costs.

STATEMENT 2 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:	
Oil production.....	\$11,727.40
Expenses:	
Operating expenses.....	5,210.65
Profit from property operations.....	6,516.75

The foregoing profit-and-loss statement is correct in form. The earnings of the concern are expressed by "Oil production." "Oil production" represents the value placed on the oil produced during

the month, regardless of the disposition made of the oil. When the income entry is "Oil production," the total monthly oil earning is indicated under one account, and the progress of the company can be gaged from a comparison of the accounts for various months.^a When the entry is used the disposition of the output must be considered, as the value placed on oil voluntarily stored must not be an estimated sales value. However, if the output is being sold on a contract or on a daily-run basis and the stored oil is disposed of as far as possible at the close of each period, the volume of oil remaining in storage is small and can be considered in the light of oil in transit and valued at the quoted sales price. At the close of a fiscal year the concern, to be conservative, should value the oil in storage at a figure approximating the cost of obtaining it.^b

"Operating expenses" represents the aggregate of expenses incurred during the month whether or not paid during the month. When this entry is used, the operating costs of oil production are compared with the value of the oil obtained. From an accountant's standpoint, this is what is desired.

In each of the statement forms following, for the sake of simplicity, "Earnings" is represented by "Oil sales," and "Expenses" by entries of detailed operating expenses incurred during the period covered by the statement.

STATEMENT 3 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE 1918.

Earnings:	
Oil sales.....	\$11, 727. 40
Expense:	
Labor.....	\$3, 065. 10
Materials.....	1, 502. 12
Miscellaneous.....	643. 43
	5, 210. 65
Profit from property operations.....	6, 516. 75

The foregoing statement represents the first attempt of the accountant to record the details of the operating expenses. "Labor" of course is the pay roll; "Materials" is fittings, supplies, etc., and "Miscellaneous" is water, fuel, light, postage, etc. In this step the accountant meets with difficulty in arriving at the distinction between "Materials" and "Miscellaneous." He hesitates to place on the ledger, and on the profit-and-loss statement under an account "Materials," entries that are not strictly representative of materials;

^a A satisfactory comparison of the earnings of a company can not be made unless the entire production is included. As "Oil production" is based on the oil produced, it is more satisfactory as a reference than "Oil sales." The amounts under both entries are affected by price fluctuations.

^b Further data in connection with "Oil production" are presented on page 35.

consequently he adopts an entry styled "Miscellaneous." If the expenses of water, fuel, pulling and cleaning wells, etc., are all included in "Miscellaneous," then it becomes too broad, and its total too large. Statement 4 seeks to remedy this defect. It is used by a great many companies.

STATEMENT 4 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales..... \$11,727.40

Expense:

Labor..... \$2,865.10

Supplies..... 1,450.00

Water..... 150.00

Fuel..... 300.00

Teaming..... 252.12

Miscellaneous ^a..... 193.43

5,210.65

Profit from property operations..... 6,516.75

Each of the entries under "Expense" is self-explanatory. "Teaming" frequently refers to teams hired. If the concern conducts its own stable, the teamster's time is charged to "Teaming," and shoeing, feed, repairs, and upkeep are also charged thereto. The "Teaming" account is serviceable as a comparative reference as long as the company does not change from maintaining its own teams to hiring them, or vice versa. The "Miscellaneous" account includes all items not chargeable to any of the other five.

STATEMENT 5 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales..... \$11,727.40

Expense:

Labor..... \$600.00

Supplies..... 250.00

Pumping..... 3,465.10

Water..... 150.00

Fuel..... 300.00

Teaming..... 252.12

Shooting..... 100.00

Miscellaneous..... 93.43

5,210.65

Profit from property operations..... 6,516.75

Statement 5 represents the first step of the accountant to express in an account the cost of doing a certain line of operating work, namely "Pumping." To this end the pay roll and the supply accounts are relieved of such part of their totals as refer to the expense of pumping.

^a Includes cost of maintenance of tools.

"Labor" therefore fails to signify the size of the pay roll. The "Supply" account likewise represents only a part of the cost of entire quantity of supplies consumed in operating work during the period. "Shooting" (other than initial work) is inserted to set forth the expense of that particular work.

The accountant realizes that the profit to be made by the oil concern during its existence will be the difference between the earnings and the expenses. He understands that maximum profits must lie in minimum expense as earnings are dependent on oil production, which is limited to the recoverable oil in the property worked, and as the market price is beyond the control of the concern.

"Labor" expressed in his "Profit-and-loss" statement in one sum will be unsatisfactory to the accountant, as he knows that the management eventually will inquire as to the purpose accomplished by the labor rather than the amount of the pay roll, in order that the operating costs may be studied intelligently. The character of the work done by the labor he finds to be as follows:

1. Pumping wells.
2. Repairing well machinery.
3. Cleaning out wells.
4. Redrilling wells.
5. Cleaning and disposing of the oil produced.
6. Supervision.
7. General work other than that connected with oil wells and disposing of oil.

The entries set forth in Statement 6 are a logical outgrowth of such considerations.

STATEMENT 6 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales.....	\$11,727. 40
----------------	--------------

Expense:

Labor—

Pumping wells.....	\$834. 31
Repairing oil wells (machinery).....	124. 17
Cleaning oil wells.....	501. 00
Redrilling oil wells.....	310. 62
General property work.....	95. 00
Supervision.....	800. 00
Storing and shipping.....	200. 00
Water.....	150. 00
Fuel.....	300. 00
Supplies.....	1,450. 00
Teaming.....	252. 12
Shooting.....	100. 00
Miscellaneous.....	93. 43

5,210. 65

Profit from property operations.....	6,516. 75
--------------------------------------	-----------

The accountant reasons that if the detailing of labor charges, as expressed in Statement 6, is of advantage to the concern, then the detailing of materials in the terms of the use to which they are put is likewise desirable.

He therefore changes the entry for "Supplies," as given in Statement 6, and combines their cost with the cost of "Labor," with the result shown under Statement 7.

STATEMENT 7 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales..... \$17,727.40

Expense:

Labor and material—

Pumping wells.....	\$1,316.65
Repairing wells.....	224.22
Cleaning wells.....	708.62
Redrilling wells.....	720.61
General property work.....	195.00
Storing and shipping oil.....	300.00
Supervision.....	850.00
Water.....	150.00
Fuel.....	300.00
Teaming.....	252.12
Shooting.....	100.00
Miscellaneous.....	93.43
	5,210.65

Profit from property operations..... 6,516.75

As "Water," "Fuel," "Teaming," "Shooting," and "Miscellaneous" can be distributed among the other accounts, Statement 7 may be condensed into Statement 8 following.

STATEMENT 8 AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales..... \$11,727.40

Expense:

Pumping wells.....	\$1,511.65
Repairing wells.....	419.22
Cleaning wells.....	908.62
Redrilling wells.....	965.61
General property expenses.....	208.43
Storage and shipment.....	352.12
Superintendence and office expense.....	850.00
	5,210.65

Profit from property operations..... 6,516.75

When the operating expenses are subdivided in order to indicate the costs of labor and material for doing certain classes of work, the profit-and-loss statement fails to show the total amount of labor and material involved for the period covered. These totals, however, are easily obtained by referring to the pay roll and to the source of the material distributed.

Another manner of detailing operating expenses is to divide them into "Operating expense," "Maintenance," and "Overhead." Without further subdivision, the two accounts first mentioned would fail to indicate unit operating costs. If further subdivided in terms of the work done, the statement would have entries similar to those shown in statement 8.

Between statements 2 and 8 there are many combinations of operating accounts. The chapter following discusses two of the profit-and-loss statements mentioned in this chapter.

CHAPTER V.

DISCUSSION OF TWO PROFIT-AND-LOSS STATEMENTS

CHARACTER OF STATEMENTS DISCUSSED.

In this chapter two forms of profit-and-loss statements are discussed. Their difference lies in the classification of accounts used to represent "earnings" and "production expenses." Either statement may be used by any oil company. Probably Statement A will be more suitable to a concern operating property where the wells rarely need repairing and where the production costs are therefore low and practically all in connection with pumping oil. The equipment other than oil wells is usually meager. Statement B may prove more suitable to the oil company that encounters difficulties in keeping its wells in pumping condition, and generally has substantial property expenses in addition to those of operating the wells. The difficulties, consisting of "cleaning out" and "redrilling," are of sufficient importance in connection with operating expenses to warrant ledger accounts or to a place in the cost statement.

The production data at the bottom of each of the statements set forth the production in barrels.

STATEMENT A AND COMMENTS.

The first statement to be discussed is designated "Statement A," and is presented below.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.^a

MONTH OF JUNE, 1918.

Earnings:	This month.	Last month.	Monthly average for year.
Oil sales ^b	\$11, 727. 40	\$13, 724. 00	\$15, 824. 91
Expense:			
Production expenses—			
Labor.....	2, 865. 10	2, 832. 00	2, 802. 09
Supplies.....	1, 450. 00	1, 510. 05	1, 370. 00
Water.....	150. 00	120. 00	145. 06
Fuel.....	300. 00	297. 00	315. 00
Teaming.....	252. 12	223. 08	235. 05
Miscellaneous.....	193. 43	184. 00	216. 08
	5, 210. 65	5, 166. 13	5, 083. 28
Administrative and general expenses:			
Administrative.....	962. 12	965. 17	948. 23
Insurance.....	75. 02	74. 02	75. 03
Taxes.....	68. 05	68. 05	71. 06
	1, 105. 19	1, 107. 24	1, 094. 32
Total expense.....	6, 315. 84	6, 273. 37	6, 177. 60
Net profit.....	5, 411. 56	7, 450. 63	9, 647. 31

PRODUCTION DATA.

	This month. Barrels.	Last month. Barrels.	Monthly average for year. Barrels.
Oil disposed of during period ^c	6, 925. 00	7, 612. 00	8, 100. 00
Oil on hand at close of period.....	225. 00	150. 00	275. 00
Total.....	7, 150. 00	7, 762. 00	8, 375. 00
Oil on hand at beginning of period.....	150. 00	262. 00	158. 06
Oil production during this period.....	7, 000. 00	7, 500. 00	8, 216. 94

^a The statement need not include the columns "Last month" and "Monthly average for year" unless comparative data are desired.

^b "Oil production" may be used in lieu of "Oil sales" (see p. 34).

^c Includes fuel used, etc.

EARNINGS.**OIL SALES.**

This account is discussed under statement 1 (p. 23). It should be credited with the amount of the bills rendered or the accounts receivable resulting from the sale and delivery of oil.^a If an oil concern uses some of its own oil on its property, the value of the quantity used should be computed at the sales price, because the company is unable to replenish the underground supply of oil. Hence it should value such part of production as is used in company operations at the sales price; that is, at the price the oil would bring if sold. This would approximate the price the company would have to pay its neighbors if it purchased its fuel from them.

Manufacturing companies are able to replenish their stocks of raw materials, and therefore they value the finished product, if used in their own operations, at the cost of the finished product, which is the cost of the raw product plus the cost of manufacturing. This would approximate the price the company would have to pay a wholesaler or other companies in the same business.

Oil accountants who value at production cost such part of the oil produced as is company consumption not only misrepresent the real operating costs but also fail to suggest to the management through their accounting that the possibilities of more economical power should be investigated. When comparison of the operating costs of various power plants is made, it is correct for the company's representative to value the oil fuel to be saved at the price that can be realized by the company from sales to its trade. Should the company sell to more than one consumer the average sales price for oil used for its own fuel is fair and the lowest sales price is permissible.

The value placed on oil used by the concern should be credited to "Oil sales," or if the concern prefers to have this account represent sales to the trade only, it may be credited to another account such as "Oil consumed," which of course will represent an earning.^b If all the oil used for fuel is charged to "Fuel," as specified on page 32, care should be exercised to charge wells being drilled with the value of the fuel used by them, so that the balance remaining in the fuel account will represent the quantity used for operating purposes only. If an oil concern desires to value the oil unshipped at the close of each month, the value placed on it may be credited to "Oil sales," and the current market price may be applied, provided the oil is not stored with intent. If it has been stored with intent, either "Oil sales" or another earning account may be credited with the estimated cost of producing it. In either case "Oil in storage" should be debited.

^a Freight charges, of course, not included.

^b "Oil consumed" includes fuel, losses from breakage of pipe lines and other causes, oil pumped into wells while they are being drilled, redrilled, or cleaned out, etc.

EXPENSE.**PRODUCTION EXPENSES—TEAMING HIRED AND WATER PURCHASED.**

If a concern has its teaming done by outsiders and if it purchases the water used, the accounts representing "Production expenses" should be made as follows:

LABOR.

To this account should be charged the amount of the pay roll employed in operating work.

SUPPLIES.

To this account should be charged the cost value of supplies used in operating work.

WATER.

To this account should be charged the cost of water used in operating work.

FUEL.

To this account should be charged the value of the fuel used. The fuel delivered to wells being drilled, for power, should be charged to "Oil wells" and credited to "Fuel." The balance remaining in "Fuel" represents the fuel account for operating wells and for cleaning and shipping oil produced. As previously stated, oil used as fuel should be valued at the price received for the oil when it is sold.

TEAMING.

To this account should be charged the amount due outsiders for teaming work in connection with operating the property.

MISCELLANEOUS.

To this account should be charged all other items of expense not included in the five operating accounts mentioned above.

PRODUCTION EXPENSES—TEAMING AND WATER SUPPLIED BY COMPANY.

If an oil concern maintains its own stable and employs its own teamsters, and also pumps its own water supply, the operating accounts previously mentioned would be made as follows:

LABOR.

To "Labor" should be charged the amount of pay roll represented in operating work, less the amount used in connection with "Teaming" and "Water station."

SUPPLIES.

To "Supplies" should be charged the cost value of supplies used in operating work, less the amount representing supplies used in connection with the stable and the water station.

WATER.

To "Water-station operations" should be charged the cost of labor, supplies, and power used to produce and deliver the water supply to the property. If the property is on an operating basis only, "Water-station operations" can be closed out to "Water," but if water is furnished wells being drilled, a proportion of "Water-station operations" is chargeable to "Oil wells," and the balance to "Water."^a

FUEL.

To "Fuel" should be charged the value of the fuel used. The fuel delivered to wells being drilled, for power, should be charged to "Oil wells," and the fuel used for the water station should be charged to "Water-station operations." The aggregate is a credit to "Fuel." The balance remaining in "Fuel," represents the fuel account for operating wells and for cleaning and shipping the oil produced.

TEAMING.

To "Teaming" should be charged the expense of stable upkeep, wagon repairs, shoeing, etc., and the wages paid teamsters; if wells are being drilled or other property equipment is being installed, a part of the teaming expense should be charged to the cost of each installation and the total credited to "Teaming." The balance remaining in "Teaming" would refer to operating work.^b

MISCELLANEOUS.

This account, of course, would include items of expense not provided for in the five operating accounts mentioned above.

ADMINISTRATIVE AND GENERAL.

ADMINISTRATIVE.

To this account should be charged the cost of conducting the administrative offices. It should include such expense as the main-office rent, salaries, expense accounts, stationery, telephones and telegrams, and postage. It may be divided into as many sub-accounts as appeal to the judgment of the management and the accountant. Its title is self-explanatory.

^a See "Clearing accounts," p. 48.

^b Other methods of teaming accounting are presented in Chapter V II (p. 18).

INSURANCE.

To this account should be charged each month's proportion of unexpired insurance premiums (see p. 12).

TAXES.

To this account should be charged each month's proportion of "Taxes accrued" (see p. 15).

STATEMENT B AND COMMENTS.

The second form of statement discussed is designated "Statement B." The form is presented below.

PROFIT-AND-LOSS STATEMENT, PROGRESSIVE OIL CO.^a

MONTH OF JUNE, 1918.

	This month.	Last month.	Monthly average for year.
Earnings:			
Oil production ^b	\$11,727.40	\$13,724.00	\$15,824.91
Expense:			
Production expenses—			
Pumping oil wells.....	1,511.65	1,701.23	1,823.19
Repairs to oil wells.....	419.22	461.10	461.10
Cleaning sanded wells.....	903.62	617.19	517.84
Redrilling wells.....	965.61	827.82	723.61
General property expenses.....	208.43	219.25	201.10
Superintendence and office expenses....	850.00	851.47	859.22
Storage and shipment.....	352.12	488.07	497.22
	<u>5,210.65</u>	<u>5,166.13</u>	<u>5,083.28</u>
Administrative and general—			
Administrative.....	962.12	965.17	948.23
Insurance.....	75.02	74.02	75.03
Taxes.....	68.05	68.05	71.06
	<u>1,105.19</u>	<u>1,107.24</u>	<u>1,094.32</u>
Total expense.....	<u>6,315.84</u>	<u>6,273.37</u>	<u>6,177.60</u>
Net profit.....	5,411.56	7,450.63	9,647.31

PRODUCTION DATA.

	This month. Barrels.	Last month. Barrels.	Monthly average for year. Barrels.
Oil disposed of during period ^c	6,925.00	7,612.00	8,100.00
Oil on hand at close of period.....	225.00	150.00	275.00
	<u>7,150.00</u>	<u>7,762.00</u>	<u>8,375.00</u>
Oil on hand at beginning of period.....	150.00	262.00	158.06
Production this period.....	7,000.00	7,500.00	8,216.94

^a The statement need not include the columns "Last month" and "Monthly average for year" unless comparative data are desired.

^b "Oil sales" may be used in lieu of "Oil production" (see p. 30).

^c Includes fuel used.

EARNINGS.

OIL PRODUCTION.

This account is discussed under "Statement 2" (p. 23). It should be credited each month with the value of all the oil produced during the month. The value placed on the oil produced depends on the disposition made of it. If the maximum quantity is sold and the unshipped part is therefore of little consequence, the amount receivable from the sale is the value placed on the quantity sold, and the current market price is the value placed on the unshipped oil. The value of the unshipped part is carried under "Oil in storage." When production is stored with intent, a value representing the estimated cost of producing it may be placed on it at the close of each month. This value likewise would be debited to "Oil in storage" and credited to "Oil production." When the oil is sold the difference between the amount received and the value first placed upon it should be credited to this account. When this is done the amount carried under "Oil production" declines during the storing period and increases at the time of sale, a feature that affects the usefulness of the entry for comparative purposes. A method to remedy this fluctuation is always to value "Oil production" at the current sales price and, when oil is stored with intent, to use an account to represent the difference between the cost of the oil and the current-sales price placed on it. This account should be treated as an offset to "Oil production" on the balance sheet, and on the profit-and-loss statement.

If the company uses on its property some of the oil produced, the value of the quantity used should be computed at the sales price.^a If all the oil used for fuel is charged to "Fuel," as suggested on page 33, care should be exercised to charge the wells being drilled with the value of the fuel used in that work so that the balance remaining in the "Fuel" account will represent the amount used for operating purposes only. The accounting in connection with the use of the entry "Oil production" is more complicated than when the entry "Oil sales" is used. The following bookkeeping entries and data explain the use of the account "Oil production."

ENTRIES.

Refining Company, Dr.....	\$11,301.75
To oil in storage.....	\$11,301.75

EXPLANATION.

For oil sold to Refining Company during month of June, 1918, per data on file.

^a See p. 31.

ENTRIES.

Oil in storage, Dr.	\$11,427.40
Fuel, Dr.	300.00
Oil loss, Dr.	
To oil production.	\$11,727.40

EXPLANATION.

(a) Month's sales.	6,745.95 barrels at \$1.675+....	\$11,301.75
(b) Company consumption.	179.05 barrels at \$1.675+....	300.00
(c) Loss from breakage, etc.	1 barrels at \$1.675+....	
Month's outgo.	6,925.00	11,601.75
(d) Inventory at close of month.	225.00 barrels at \$1.675+....	376.96
Total accounted for.	7,150.00	11,978.71
(e) Deduct on hand per last month's closing inventory.	150.00 barrels at \$1.675+....	251.31
Production.	7,000.00.....value.....	11,727.40

NOTES.

Oil in storage= $a+d-e$.

Company consumption (b) may include oil put into holes (wells) as well as fuel, in which event an account should be charged.

For brevity, the purchaser of the oil is assumed to be "Refining Company."

EXPENSE.

PRODUCTION EXPENSES.

PUMPING OIL WELLS.

This account is made up of two kinds of expense as follows:

1. Well expense other than repairs, such as the cost of packing for the engine and for well equipment, and cylinder oil, gaskets, lubricants, etc., each of which can be charged directly to a well.

2. The cost of supplying power to the wells.

Inasmuch as "Pumping oil wells" is not the only account that deals with power supplied by a boiler plant or power station, it is evident that the easiest manner to derive each account's proportion is to charge all power expense to a station number, and, after the month's total is obtained, to prorate it to "Pumping oil wells" and to the other accounts involved.^a Power used on a well after it is completed is either for pumping or in connection with repairs, and hence well-operating accounts should be charged their share of power-plant operations whether or not oil is being obtained.

^a See p. 51.

REPAIRS TO OIL WELLS.

To this account should be charged the cost of keeping the derrick, well machinery, etc., in repair. Such items as new lumber for the derrick, new valves, fittings, well pumps and parts, rods, tubing, and lead lines come under this heading. The labor costs of pulling rods and tubing and inspecting well pumps in connection with the above work (when not a cleaning job) are also chargeable to "Repairs to oil wells." Power, if used, is chargeable to this account.

CLEANING SANDED WELLS.

"Cleaning sanded wells" means removing the sand from the bottom of the well when it has accumulated sufficiently to interfere with the working of the well pump or with the running of the oil into the hole. To the well-cleaning account should be charged all expense in connection with the cleaning out of a well when it has become "sanded." Such expenses include labor, supplies, tools lost or broken in the work,^a and a part of the expense of "Power-plant operations."

REDRILLING WELLS.

Redrilling a well means restoring the hole of the well to such a condition that the oil strata originally drained by it may again be drained. Redrilling may be made necessary because of collapsed casing, shifting of the underground formations, loss of tools, etc. Redrilling implies the use of drilling tools to carry out the work. To the redrilling account should be charged the expense of redrilling. This would include labor, teaming, supplies, casing, a part of the expense of "Power-plant operations," tools lost or broken in the work,^a and all other expense incurred in connection with the work up to the time the well is again turned over to "Production."

GENERAL PROPERTY EXPENSES.

On every oil property there may be many units other than oil wells that have to be worked or repaired, such as tanks, pipe lines, buildings, telephone systems, and electric systems. Also there may be a class of expense not in the nature of working or repairing investment units which comes under this heading, namely, cleaning up around property, plowing fire guards, and repairing other than company roads.

In order to save bookkeeping, all such expenses can be classified under one head, "General property expenses." If a company operates a large property, this account, because of its size and the variety of work it covers, becomes unsatisfactory as a reference to

^a Dependent upon the method used in connection with the accounting of tools (see p. 71).

ascertain costs. Consequently "General property expenses" may have to be subdivided, so that the cost of each kind of work charged thereto may be a matter of record. This can be done easily by means of numbering the accounts as explained on page 107.

The nature of the subdivisions would be somewhat as follows:

- (a) Teaming (operating proportion).^a
- (b) Lease work.
- (c) Water system (upkeep of distributing system on property).
- (d) Building repairs (on buildings not rented out).
- (e) Electric system (operations).
- (f) Catch-basin construction and maintenance.
- (g) Oil-tank repairs and maintenance (except storage tanks).
- (h) Oil-line repairs and maintenance (except shipping lines).
- (i) Tool repair and maintenance (operating tools only).
- (j) Plowing fire guards.

SUPERINTENDENCE AND OFFICE EXPENSE.

This account is self-explanatory. It includes the salaries of the superintendent and the clerks, the cost of the office upkeep, and the like. Expense accounts of the superintendent and the clerks, unless incurred for the benefit of some particular work, are chargeable to this account. When the superintendent directs construction work a part of this account is chargeable to that work. The amount remaining under "Superintendence and office expense" is therefore such part as refers to operations only. If desired, all overhead expense at the property may be charged to "General superintendence and office expense" and the operating proportion charged to "Superintendence and office expense."^b

STORAGE AND SHIPMENT.

To this account should be charged the expense of taking care of the oil after delivery from the wells into the sumps or tanks. The cost of care of sumps, reservoirs, storage tanks, and oil lines from the storage tanks, and the cost of operating line pumps come under this account. Should the operating company maintain an oil-cleaning or dehydrating plant, the costs of operating this may be charged hereto, and should the company maintain loading racks the expense of operating them should also come under this account.

Selling expense is, of course, a subdivision of "Administrative expense."

^a When equipping and operating work are carried on jointly "Teaming" may be a proportion of "General teaming" (see p. 49).

^b See p. 51.

ADMINISTRATIVE AND GENERAL.

ADMINISTRATIVE.

To this account should be charged the cost of conducting the administrative offices. It should include such expense as the main-office rent, salaries, expense accounts, stationery, telephones and telegrams, and postage. It may be divided into as many sub-accounts as appeal to the judgment of the management and the accountant. Its title is self-explanatory.

INSURANCE.

To this account should be charged each month's proportion of "Insurance unexpired" (see p. 12).

TAXES.

To this account should be charged each month's proportion of "Taxes accrued" (see p. 15).

CONCLUSIONS.

In presenting the description of accounts covered by Statement B, reference has been made to "Power-plant operations," "General teaming," and "General superintendence and office expense." It often happens that a concern is both equipping and operating its property at the same time, and, when such is the case, each of the accounts above mentioned has to be apportioned among equipping accounts and operating accounts. It is evident that the accounts set forth in Statement A would be impractical in the accounting of a company that does its own drilling, as when both equipping and operating work are being carried on, these accounts fail to furnish a suitable classification of the expenses that must be apportioned.

It is the writer's opinion that Statement B is the better for the following reasons:

1. It reflects operating costs made necessary by the physical conditions of the property worked.

2. It enables the management to estimate the probable operating costs of new wells if drilled in similar territory.

3. It reflects the amount of well cleaning and redrilling done; hence the fluctuation in oil production will be understood, as no production is obtained when wells are being cleaned and redrilled.

4. If the cleaning and redrilling accounts evidence seemingly excessive work, they automatically call the attention of the management to the need of investigating the pumping methods employed.

5. When new wells are to be drilled and various partly drilled properties are under consideration it enables the management to choose intelligently the properties that are least troublesome to operate.

If desired, Statement B can be used by the company that operates in shallow and easily drilled formations. If the pumping is done with a pumping power,^a which is generally used, the prorating of "Power-plant operations" to equipment accounts and to repairing, cleaning, and redrilling of oil wells is eliminated. Horses generally furnish the power for pulling rods, tubing, and pumps, and for cleaning. Power stations are only for the pumping of oil.

When redrilling work is necessary, which is rare, it is done by a contractor, who on completing the work presents his bill. The amount of the bill, together with the fuel, water, casing, etc., furnished by the oil concern represents the charges to be made against redrilling wells. "General property expenses," "Superintendence and office expenses," and "Storage and shipment" would be charged with the same nature of work described under these heads in preceding pages, except that as regards "Superintendence and office expenses" the time of the superintendent, if he works with his men, would be charged to the nature of the work he performs.

This chapter has discussed earning and operating accounts of the concern whose only earning is from oil. The following chapter sets forth other earning and operating accounts that may be used.

^a See footnote on p. 4.

CHAPTER VI.

OTHER TYPES OF INCOME AND EXPENDITURE ACCOUNTS.

OTHER ACCOUNTS SOMETIMES REQUIRED.

An oil company may desire to use revenue and expense accounts other than those described in Chapters IV and V to reflect the following:

1. Revenues earned and their costs, resulting from activities of the company other than in the production of oil.

2. Earnings and expenses resulting from the company charging its own work with rentals and the like, either to cover the costs of furnishing the service or to reflect the saving due to ownership of the service.

FORMS SHOWING FOUR TYPES OF STATEMENT.

Profit-and-loss statements may show such profits as those mentioned under the title "Profit from miscellaneous operations," expressed in one amount, as in Statement C following, or they may show "Miscellaneous earnings," "Miscellaneous expenses," and "Profit from miscellaneous operations," with the total of each expressed in one amount, as in Statement D following. Again, each of the miscellaneous earning and expense accounts may be enumerated at the bottom of the profit-and-loss statement, as in Statement E following. Also the miscellaneous earnings and expenses set forth under Statement E might well be grouped as shown in Statement F following. When there are many miscellaneous earnings and expenses, Statement C may be used, and the net result shown thereon, supported by a supplemental profit-and-loss statement, which would set forth the details covered by Statement E.

STATEMENT C.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:	
Oil sales.....	\$11,727.40
Expense:	
As detailed in Statements A and B of Chapter V.....	6,315.84
Net profit from oil production.....	\$5,411.56
Profit from miscellaneous operations.....	600.00
Total net profit.....	6,011.56

PRODUCTION DATA.

As detailed in Statements A and B (pp. 30 and 34).

STATEMENT D.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales..... \$11,727.40

Expense:

As detailed in Statements A and B of Chapter V..... 6,315.84

Net profit from oil production..... \$5,411.56

Add:

Miscellaneous earnings..... 1,200.00

Less miscellaneous expenses..... 600.00

Profit from miscellaneous operations..... 600.00

Total net profit..... 6,011.56

PRODUCTION DATA.

As detailed in Statements A and B (pp. 30 and 34).

STATEMENT E.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

Earnings:

Oil sales..... \$11,727.40

Expense:

As detailed in Statements A and B of Chapter V..... 6,315.84

Net profit from oil production..... \$5,411.56

Miscellaneous earnings:

Water sales..... \$100.00

Team rentals..... 100.00

Tool rentals..... 150.00

House rentals..... 200.00

Commissary revenue..... 250.00

Crop revenue..... 200.00

Land rentals..... 100.00

Gas sales..... 100.00

1,200.00

Miscellaneous expenses:

Water-station operations..... 50.00

Teaming..... 50.00

Tool maintenance..... 50.00

Rented-buildings maintenance..... 100.00

Commissary operations..... 200.00

Crop expense..... 150.00

600.00

Profit from miscellaneous operations..... 600.00

Total net profit..... 6,011.56

PRODUCTION DATA.

As detailed in Statements A and B (pp. 30 and 31).

STATEMENT F AND COMMENTS.

PROFIT-AND-LOSS STATEMENT OF PROGRESSIVE OIL CO.

MONTH OF JUNE, 1918.

MISCELLANEOUS EARNINGS AND EXPENSES.

Water sales.....	\$100.00	
Less water-station operations.....	50.00	
		\$50.00
Team rentals.....	100.00	
Less teaming.....	50.00	
		50.00
Tools rentals.....	150.00	
Less tool maintenance.....	100.00	
		50.00
House rentals.....	200.00	
Less rented-buildings maintenance.....	100.00	
		100.00
Commissary revenue.....	250.00	
Less commissary operations.....	200.00	
		50.00
Crop revenue.....	200.00	
Less crop expense.....	100.00	
		100.00
Land rentals.....		100.00
Gas sales.....		100.00
Net profit from miscellaneous operations.....		\$600.00

Generally speaking, the amount of business reflected by these accounts is too small to warrant entries in much detail. Hence, Statement C probably will be satisfactory to the company. However, when "Miscellaneous operations" assumes large proportions, Statement F may be adopted.

A brief discussion of each account referred to in Statement F follows.

WATER SALES.

This account should be credited with the income to the concern from the sale of water. The functions of the account are affected by the following conditions:

1. An oil concern may charge each of its facilities ^a at a specified rate for the water delivered to it.
2. It may apportion among these facilities the cost of supplying the water used by them.

^a As explained in the introduction, the term "facilities" is used herein to designate the things or agencies that must be used in producing oil. Wells, tanks, draft animals, power plants, and buildings constitute facilities.

3. It may sell water to its neighbors.

If condition 1 is in effect, the aggregate of the charges against company work is a credit to "Water sales," and if water is sold to the company's neighbors the amount of the bills rendered them would also be a credit to "Water sales." To cover the costs of supplying water to the property and to the neighbor an account "Water-station operations" would be required. The difference between "Water sales" and "Water-station operations" would reflect the profit set forth in Statement F.

If the costs of "Water-station operations" are apportioned among the facilities to which the water is delivered and if water is not sold to neighbors, the account "Water sales" is not required. However, should the company sell water to its neighbor, the account "Water sales" would be required, and the entire amount of the bill rendered could be credited thereto on the assumption that the amount of the bill would be clear gain. Whether this assumption is tenable depends on the proportion of water sold to that used for company work; also on the cost of obtaining it.

If the company is to assess each of its units for the quantity of water used by the unit, the quantity used must first be ascertained. If this is done, there is no reason why the costs of "Water-station operations" can not be apportioned among the same facilities on the basis of the quantity used. This arrangement would eliminate the use of "Water sales" as far as company consumption is concerned.

WATER-STATION OPERATIONS.

A description of this account is presented in Chapter VII following (pp. 48 to 51).

TEAM RENTALS.

The use of this account, like that of the "Water sales" account, depends on the method employed by the company to distribute the teaming expense.

If an oil concern charges its own facilities at a specified rate for the teaming service given, "Team rentals" will be required to reflect the income, and an account "Teaming" (in the sense of teaming expense) will be required to reflect the costs of maintaining the service. If teams are rented to neighbors, the rent receivable will be a credit to "Team rentals."

If, on the other hand, the concern charges each of its facilities receiving team service with the labor of the teamster, and apportions among the same facilities the costs of stable upkeep, such as stableman, hay, grain, shoeing, and wagon repairs, the "teaming" is done away with each month.^a "Team rentals" in this instance would

^a See p. 49.

not be required unless teams were rented to neighbors. The entire amount of the bill rendered for such service could be treated as clear gain, or a nominal allowance for the upkeep of the team during the period it is rented might be deducted therefrom and credited to "Teaming" before the charge for that account is apportioned.

Many oil companies maintaining teams do not work them steadily. Under this condition some costs of stable upkeep continue even though the rentals accruing from charges for company work might be negligible. The rental system, therefore, might result in a deficit as well as in a profit.

TOOL RENTALS.

The use of the "Tool rentals" account also depends on the methods employed by the oil concern in distributing the costs of "Tool maintenance." "Tool rentals" may be subdivided into "Drilling-tool rentals" and "Cleaning-out-tool rentals." A full description of the functions of these accounts is presented in Chapter IX (p. 71).

TOOL MAINTENANCE.

The use of the "Tool maintenance" account depends on the use of the "Tool rentals" account. Further details in connection with the use of these accounts will be found under Chapter IX (p. 71).

HOUSE RENTALS.

"House rentals" should be credited with the rents realized from company structures. As the buildings generally are rented to company employees, the pay-roll deductions cover the collections. (See p. 52.) The expense of maintenance of the structures should be charged to "Rented-buildings maintenance," so that the costs of caring for them will not be charged against earnings from oil production.

RENTED-BUILDINGS MAINTENANCE.

This account is used in connection with "House rentals," as described above.

COMMISSARY REVENUE.

To this account should be credited all revenue to the company resulting from the operating of the commissary department. A separate ledger account should be kept with each independent cookhouse.

COMMISSARY OPERATIONS.

To "Commissary operations" should be charged the cost of labor employed in operating the cookhouses. Such labor includes cooks, waiters, roustabouts, etc. The supplies consumed in the course of

operation should also be charged to this account. Repairs and renewals to the cookhouses and to kitchen and mess-room equipment should be charged to this account; also teaming expense and compensation insurance, if extensive. (See p. 20.)

As previously mentioned, an oil concern may rent the commissary branch to a person who assumes the expenses and to whom is given the pay-roll deductions. If the camp is small the company may be required to pay a bonus to aid the manager of the cookhouse. The amount of bonus paid may be charged to this account. The operating part of it may be charged to "Miscellaneous" to "General field expenses," or "Commissary operations," the separate account being given a place under "Production expenses" as detailed in Statements A and B (pp. 30 and 34). The equipping part of the bonus should be charged to the units being equipped.

CROP REVENUE.

To this account should be credited the income resulting from crops raised on the oil concern's property. If the concern raises its own crops, the value placed upon them, when harvested, is credited to this account. If an outsider farms the concern's property on a royalty basis, the part of the profits received by the concern should be credited to this account. As crop raising is generally of minor importance, it is probably best for the concern to value the crop return at the amount received if it is sold, and at the local market value if it is held for company use.

A separate ledger account should be carried for each kind of crop stored. On the balance sheet the values of these may be combined and shown under "Crops in storage," which should be listed under "Current assets."

CROP EXPENSE.

This account is to be used when an oil company goes to expense to gain or dispose of crops as described above.

LAND RENTALS.

To this account should be credited the oil concern's earning from the renting of parts of its property. Such an account is sometimes required by a company owning large tracts of land that are rented to farmers, ranchers, cattlemen, etc. As the payment received as rental may be in barter or in cash, it follows that "Land rentals" often deals with crop conditions, and then "Crop revenue" and "Land rentals" are combined into one account styled "Crop revenue and land rentals." When this latter account is used all earning from either source appear under it.

Expenses in connection with "Crop revenue and land rentals" may all be carried as "Crop expense," as "Land rentals" implies an income free from expense.

GAS SALES.

To this account should be credited the oil company's income from the sales of natural gas. If the sales assume large proportions and special pipe lines are required to collect and deliver the gas, the costs of conducting this branch of the business should be charged to a special account which will be opposed to "Gas sales."

The company will doubtless have other "Miscellaneous earnings and expenses" that will require special accounts. However, discussion of all of them is impracticable.

CHAPTER VII.

CLEARING ACCOUNTS.^a

Every oil concern can be regarded as working two classes of facilities or agencies, as follows:

- (a) Units (wells, tanks, pipe lines, etc.) being equipped or operated.
- (b) Intermediary agencies operated for the benefit of these units.

As regards facilities under *a*, the work itself receives the entire benefit of the outlay upon them, and therefore a direct charge may be made from the pay roll, the warehouse account, or bills of purchases. However, as regards facilities under *b*, it is impractical to charge a part of each item of expense for them to the units served. Therefore the expenses of such facilities are assembled during the monthly period and their total prorated to each unit served during the month.

"General teaming," "General superintendence and office expense," and "Power-plant operations" are the intermediary accounts. Throughout this report they are referred to as "Clearing accounts."

The extent to which oil companies use clearing accounts depends largely on the accounting used. The operator working in territory that is shallow and easily drilled will probably have little use for the accounts "Power-plant operations" and "General superintendence and office expense," as he usually has his wells drilled by a contractor. Therefore, these accounts if used would refer mainly to operating expenses, which consist principally of pumping oil wells.

Rather than apportion "clearing accounts" many companies treat the entire costs involved in them as an expense of producing oil. They consider this procedure conservative. On the other hand, others adopt the plan of charging a rental against each unit served and applying the total of the rentals against the expense of maintaining the service given. This plan is applied particularly to "General teaming" and "Water-station operations."^b As outside rates are often applied, it follows that the application of rentals invariably results in showing a profit, and as the main charges in each of these accounts is for equipment, such profits as are made swell both the assets and the miscellaneous earnings.

^a "Clearing accounts" represent indirect charges.

^b "Power-plant operations" is the controlling account of "Water-station operations."

Often miscellaneous earnings, as reflected on a financial statement, represent profits earned by overcharging both assets and operating costs by the application of rentals. This system may have been adopted to facilitate the accounting. If desired, it can be eliminated by apportioning each month among the units served the costs of operating, carried in the clearing accounts.

Following is a discussion of the manner of assembling the clearing accounts and of prorating the charges represented in them to the units served. The use of account numbers (see p. 107) greatly facilitates the handling of these accounts.

GENERAL TEAMING.

Charges from this account should be prorated to (1) facilities being equipped (by their unit numbers); (2) plant operations (by their station numbers); (3) general property expenses (not further divided into operating accounts).

The account should be charged with the costs of shoeing, hay, grain, feed, wagon repairs, etc.—in short, the general upkeep of the stable. Also, it should be charged with the wages of teamsters, or bills of outsiders for teaming work done, when it is impossible to make a direct charge to other facilities. The proportion chargeable to operation is chargeable to "General property expenses," and need not be further subdivided. But the part chargeable to equipment must be apportioned among each of the equipment units.

No satisfactory basis for the apportionment of "General teaming" can be determined. The value of materials hauled is unsatisfactory, as their value is not based on bulk or weight. The amount of labor employed is unsatisfactory, as it does not indicate the quantity or the value of the material handled by the labor.

This account is seldom large, as the cost of the labor of teamsters is excluded from it, and the amount involved is considerable only when extensive drilling is being done. The field force is best able to cope with the situation. Reference to the pay roll will disclose where the bulk of the teamsters' time is distributed, and the field force with this knowledge will be able to compile the form shown on Form 2 following.

The method described above is not entirely accurate, nor is the teaming-rental system as previously described (p. 44). However, they are both relatively accurate.

FORM 2.—General form for distributing clearing accounts.^a

PROGRESSIVE OIL CO.

Distribution of charges for boiler plant 1, account 21, month of June, 1918.

Facility supplied.	Account No.	Remarks.		Total (per cent).	Labor.	Fuel.	Maintenance.	Accountant's record of cost per facility.
		Hours served.	Power units.					
Well 22.....	1	700	700	0.057				45 60
23.....	1	720	720	.058				46 40
24.....	1	720	720	.058				46 40
25.....	1	391	391	.032				25 60
26.....	1	720	720	.058				46 40
29.....	1	720	720	.058				46 40
30.....	1	720	720	.058				46 40
31.....	1	720	720	.058				46 40
32.....	1	720	720	.058				46 40
33.....	1	720	720	.058				46 40
34.....	1	720	720	.058				46 40
35.....	1	720	720	.058				46 40
36.....	1	720	720	.060				48 00
22.....	2	10	20	.001				80
14.....	3	150	450	.037				29 60
14.....	4	600	1,800	.146				116 80
Storage and shipment.	7	125	375	.031				24 80
Well 27.....	51	120	360	.029				23 20
28.....	51	110	330	.027				21 60
		12,346						
Total percentage.....				100%	100%	100%	100%	800 00
Total expenditure.....				\$800	\$	\$	\$	800 00

Basis of apportionment:

Pumping wells require 1 unit of power per hour.

Repairing and cleaning require 2 units of power per hour.

Redrilling, 3 units of power per hour.

Drilling, 3 units of power per hour.

Running line pump, 3 units of power per hour.

All wells on steam.

John Doe, Superintendent.

Date compiled, July 3, 1918.

^a Convenient size, 8½ by 11 inches.

The field force furnishes all the data for this form except for the "cost per facility." The accountant inserts the latter data when all the operating costs are in his possession, apportioning the total amount among the facilities, basing his apportionment on the percentage figures. The "Total" column is used when all costs of the unit giving the service apply to all the facilities served. The "Labor," "Fuel," and "Maintenance" columns are for use in distributing charges for boiler plants when wells flow and therefore should be relieved of charges for fuel and for boiler-plant maintenance. Labor, being services of pumpers, of course applies to flowing wells as well as to wells on steam.

The field clerk obtains the figures as to the hours worked from the pumper's reports or from the reports of daily production. This calculation is simplified by deducting the idle time of each unit worked from the number of working hours per month. The accountant debits the distribution (in controlling accounts) and credits the controlling account of the unit that furnished the service.

If individual well costs are desired, Form 2 furnishes details. Otherwise, the individual well costs need not be computed on the form. The distribution of clearing accounts, when both equipping and operating accounts are supplied, is taken care of by this form.

GENERAL SUPERINTENDENCE AND OFFICE EXPENSE.

Charges from this account should be prorated to (1) facilities being equipped (by their unit numbers); (2) superintendence and office expense (not further divided into operating accounts).

The account includes charges for labor and supplies. Charges against it are made from the distribution of the pay roll and from the distribution of the account for material and supplies. The part that is prorated to the operating account is not further subdivided, but the part relating to investment facilities is divided into each unit being equipped. The basis of proportion is arbitrary. Generally speaking, the most accepted practice is to prorate the total "general superintendence and office expense" among the accounts on the basis of the amount of labor supervised. When a large amount of equipping work is done, it is often advantageous to use an additional overhead account, namely, "Drilling supervision." To this latter account would be charged all expense distinctly for the purpose of supervising equipping work; also such part of the "general superintendence and office expense" as is for equipping. The sum of these two may then be prorated to each equipping unit on the basis of the labor supervised.

POWER-PLANT OPERATIONS.

Charges from this account for each station should be prorated to (1) facilities being equipped that are supplied by it (by their unit numbers); (2) operating units that are supplied by it (by their account names or numbers).

The boilers and steam lines constitute a station, and all repairs and supplies should be charged to the operating account of the station number. As set forth heretofore, this account serves to gather together into one sum the cost of operating, repairing, and maintaining each power station, so that the total may be apportioned among the facilities deriving benefit from the station. Thus, each station as a separate unit would be charged with fuel, oil, waste, gaskets, boiler compound, labor of pumpers, etc. The distribution of each station's expense is taken care of by the superintendent (see Form 2). If water is purchased for the boilers, it is chargeable to this account.

Pumping powers and their connections also constitute a station, and all repairs and supplies should be charged to the operating account of the station number.

If the property has its own water well and maintains a water station to pump its water, the expenses for pumping, labor, and material are chargeable to the operating account of the water station. This total is likewise proportioned by the superintendent (see Form 2).

If a central forge station is maintained to sharpen bits for several drilling wells, etc., its accounting should be treated in a like manner.

CHAPTER VIII.

ACCOUNTING FOR LABOR AND MATERIAL.

There are two sources of charges against all accounts, namely, labor and material, and their consideration involves a study of the pay roll and of the bills of purchase, or the warehouse disbursements.

TYPES AND USES OF PAY ROLLS.

There are many types of pay-roll forms. Those whose data are clearly arranged are the most satisfactory. The pay roll should, of course, show the name, occupation, time, rate, and amount earned by each employee; also the deductions from his earnings, such as board, insurance, and house rent. The distribution (see Form 4) of each time sheet should be expressed in terms of the accounts that are in use, and the total of the extensions of the accounts should agree with the amount earned by the employee.

To support each time sheet a daily time card (see Form 3) should be filled out by the employee, in which he sets forth the time he has worked and the nature of the work performed. Some companies furnish a time card upon which is printed the accounts being used, the employee being expected to designate opposite each account that classifies the nature of the work he has performed the number of hours spent on it. However, as the distribution of work often puzzles the accountant, the workingman is much less to be expected always to classify his work intelligently. It is the writer's opinion that a daily time card without reference to distribution is preferable, because the employee, in writing down the work done and the time spent upon it, furnishes the office clerk with the facts that enable him to distribute the expense to the appropriate accounts.

Specimen forms showing a daily time card, three types of pay-roll forms, and a form for presenting the distribution of pay roll or warehouse disbursements follow:

FORM 3.—*Form for daily time card^a*

DAILY TIME CARD.

Date.....191...

Name.....

Hours.	Class of work.
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	

Approved.....

NOTE.—The employees must see that time cards are handed in daily without exception, to the man in charge of each piece of work for approval.

^a Convenient size, $3\frac{1}{8}$ by $6\frac{1}{4}$ inches.

Form for pay roll.^a

No. 14

Time sheet for month of *June, 1918.*

Amount for period.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Totals for month.			
																	Time.	Rate.	Amount.	
30.00	1	1	1	1	1													15	2.00	30.00
						1	1	1										3	4.00	12.00
30.00																				59.00
15.00	1	1	1	1	1	1	1	1											25.00	
	Supt. advances First } This } 5.00																			
	Sundries " }																			
	Paid by ----- office first half.....																	15.00		
15.00	Total deductions for month.....																		43.00	
15.00	Balance due for month.....																		16.00	
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
																		15	2.00	30.00
	1	1	1	1	1													3	4.00	12.00
						1	1	1										3	3.00	9.00
Total																				59.00

^a Convenient size, 8½ by 14 inches. Binding holes on left.

Form 6.—Form for pay-roll recapitulation.^a

PROGRESSIVE OIL CO.

FINAL AND RECAPITULATION PAY-ROLL SHEET.

Pay roll of Johnson property for June, 1918.

Sheet No. 2.

No.	Employee.	Occupation.	Time (days).	Rate.	Total amount.	Deductions.				Balance due.	Paid by check No.
						Board.	Supt. adv.	Sum- dries.	Paid by S. P. office.		
		Forward			\$2,159.10	\$50.00	\$85.00		\$95.00	\$95.00	
11	John Doe	Supt.	30	\$20.00	600.00				60.00	155.00	61
12	J. Krupp.	Clerk	30	125.00	35.00				65.50	65.50	62
13	James Smith	Roustabout	11	2.00	22.00		10.00		2.00	32.00	
14	C. Anderson	Driller	30	8.00	240.00	30.00	30.00		180.00	100.00	
15	D. Greiner	Toolie.	30	4.00	120.00				60.00	60.00	63
16	S. Fritschman	Roustabout	15	2.00	30.00						
16	S. Fritschman	Toolie	5	4.00	20.00				15.00	20.00	64
16	S. Fritschman	Teamster	3	3.00	9.00	3.00	3.00			4.00	
	Total				2,865.10	90.00	400.00		494.50	2,682.50	1,657.50
Total amount of pay roll						Dated: July 8, 1918		Certified correct.		Approved:	
Deductions:										J. Krupp, Clerk.	
Board.....										John Doe, Superintendent.	
Supt. advances.....											
Sundry.....											
Paid by office.....										Approved:	
Balance due.											

FORM 7.—Form for showing distribution of pay-roll or warehouse disbursements.^a

PROGRESSIVE OIL CO.

Distribution of pay roll or warehouse.

Property *Johnson.*Month of *June, 1918.*Sheet No. *1.*

Asset. No.	Account.	Facility.	Amount.	Total.
	Forward			
2	Repairs to oil wells.....	Well 16.....	\$119.12	
		Well 22.....	25.50	
		Well 25.....	74.50	
				\$219.12
3	Cleaning sanded wells.....	Well 14.....	220.00	
		Well 25.....	183.72	
				403.72
4	Redrilling wells.....	Well 14.....		365.36
5	General property expenses.....	Teaming.....	55.00	
		Lease work.....	25.10	
		Road work.....	28.58	
				108.68
6	Superintendence and office expense.....			850.00
7	Storage and shipment.....			112.12
21	Power-plant operations.....	Boiler plant 1.....	400.00	
		Boiler plant 2.....	100.00	
		Power plant 1.....	106.10	
				606.10
51	Oil wells.....	Well 27.....	100.05	
		Well 28.....	99.95	
				200.00
	Total.....			2,865.10
Dated:	Certified correct:	Approved:	Approved:	Approved:
<i>July 3, 1918.</i>	<i>J. Krupp,</i> Clerk.	<i>John Doe,</i> Superintendent.		

^a Convenient size, 8½ by 11 inches.

When controlling accounts^a are used, the distribution of the pay roll should indicate under them the cost of the outlay on each of the equipping units, and on each power plant (see Form 7). If a cost statement of operating expenses is desired, the operating accounts likewise should be detailed into units. The amount of the controlling accounts only need be carried to the general ledger, as the details of such accounts may be carried in separate records whose totals will support the controlling accounts in the general ledger. As regards equipment, the separate record is a permanent record; as regards operating expenses, it may be a detailed cost statement.

Pay rolls, when taken into the books of account, may be so handled that their distribution will be debited and "Pay-roll account" will be credited on the ledger. If this is done, "Pay-roll account" should be debited when payment is made, balancing the account. One

^a Controlling account: An account in the general ledger that serves as a check or control on subordinate entries in a subsidiary ledger.

advantage of this system is that the pay roll, a pressing liability, will always be shown on the detailed balance sheet as "Pay roll" or "Account payable—pay roll," instead of as an audited voucher. Another advantage is that the ledger account "Pay roll-account" will be a built-up record of the pay rolls of the company, which may prove a valuable reference. Pay rolls and their distribution also may be taken into account by means of an audited voucher. If so, the amount of the audited voucher may be for the amount of the pay roll less its deductions, and the distribution of the voucher should be the distribution of the pay-roll recapitulation. When the audited voucher is paid, the bookkeeping will be identical with that used in connection with the payment of any other audited voucher.

Employees may be paid in cash or by check. If they are paid in cash, one check, of course, furnishes the distributing agent with the funds. If the employees are paid by check, a special form of check, or specially numbered checks, are often advantageous. The total of the pay-roll checks issued should equal the liability taken into the books when the pay roll is audited. If special checks are used in connection with the pay roll, an insert of thin paper may be bound in the check book following each page of checks. Numbers corresponding to the check numbers should be placed on the inserts. The object of this system is to furnish a carbon copy of each check drawn in order that the use of check stubs may be eliminated.

ACCOUNTING FOR MATERIAL.

The distribution of costs of materials is more difficult than that of labor. An invoice may carry its distribution in the same manner as an employee's time sheet, but all of the material included in the invoice may or may not be for immediate use, or it may be for temporary use, and may later be credited to the facility first charged. Hence, a material-and-supply account, or a warehouse account, should be kept to record the value of the stocks on hand.

Many oil concerns, particularly after development is concluded, purchase materials in small quantities and only as required. They charge the distribution of the bills to such accounts as they expect will get the value either immediately or ultimately. Such concerns, of course, are favored by being near supply houses which carry material that otherwise would have to be carried by the operator so as to be readily available.

Larger concerns, whether near supply houses or not, prefer to carry some necessities, and when the supply houses are at some distance they often keep on hand substantial stocks. "Warehouse" is the style of account generally adopted to represent these stocks and their movements.

If "Warehouse" or a similar stock account is not used, the bills of purchase should be approved by the superintendent on receipt of goods and the distribution should be marked on the bills. The accountant, when auditing the bills, debits the accounts to which they have been distributed.

One consideration regarding the advisability of keeping a "Warehouse" account is that supplies may be used in either equipping or operating work, regardless of the account to which they have been charged at the time of purchase. Moreover, materials discarded by equipment units are neither charged to current work when used nor credited to the unit parting with them. Many of the asset values reflected on the books, therefore, may be too high, as a part of their equipment is on another unit, which, not being charged with the value thereof, does not show the correct amount expended on it.

All oil companies of medium size should carry a "Warehouse" account. However, small companies, when once equipped, probably are justified in discontinuing this account, as the benefits to be gained may not warrant the cost of keeping the account. Where the oil property is small the superintendent is expected to be so thoroughly acquainted with his equipment and supplies that detailed accounting for them is not necessary to prevent loss by carelessness.

If a "Warehouse" account is used by the operator, material and supplies when purchased are charged to that account. Materials and supplies when used are charged to the facilities receiving them and the warehouse is relieved of the aggregate. Suitable records must be kept by the concern so that a check may be kept on the supplies and so that the pricing of the outgo may be based on the invoiced costs plus freights.

It is a common practice for a company to maintain at its oil property a "Warehouse" account that deals in units only. The count and the description of each unit of material received by the warehouse is recorded on the books kept by the field clerk, and these data are forwarded to the main office. There the information is incorporated into the records, and when the freight bills and the bills of purchase are received the materials are priced by units.

When units are disbursed by the warehouse clerk he advises the main office, stating the distribution, count, and description of each unit given out. The clerk in the main office prices the report, deducts the outgo from his warehouse records, and transmits the data to the accountant. The accountant thereupon debits the distribution and credits "Warehouse." One advantage of this system is that the purchasing agent in the main office prices both the intake and the outgo, and by keeping a check on the stocks on hand is often able to save money for the company by buying at opportune times. Also, he can ascertain by examining the records that the old stock is rea-

sonably exhausted and has been accounted for before it is replenished. To save time and increase accuracy the field clerk and the main-office clerk should compile their records of receipt and disbursements from copies of the same report.

Some companies keep in the field office all the data connected with their warehouse accounts. The field clerk receives bills in duplicate from the firms dealt with and, after checking them up as to receipt of goods, forwards the originals to the accountant of the main office, retaining the duplicate. The count, description, and price of each item of the bill is copied onto a warehouse stock record containing a page for each item. (See Form 14, p. 67.)

When the warehouse gives out materials, the field clerk deducts from the stock record the units given out, prices them, and carries out the extensions; then forwards the report to the accountant in the main office. As the report is completed by the field clerk, it is received by the main office in readiness to be entered on the books.

The accountant in the main office debits the "Warehouse" account with the amount of bills approved and submitted by the field clerk, and relieves the "Warehouse" account of the total of the disbursements reported. The ledger balance, therefore, is supported by the detail of the stock record which is kept by the field clerk.

In connection with the two systems discussed, it may be said that they are equally accurate in reporting the count, description, and distribution of materials given out, but that the former has a double check on the stock record, as both the field clerk and the office clerk makes a record of the receiving and giving out of each item of the warehouse stocks. However, a competent clerk at the field, equipped with stock-record forms similar to those used by the office clerk, should be able to price the outgo of the stocks as accurately as can the office clerk.

Among the advantages of the second system presented are:

(a) Duplicate warehouse detail records are eliminated.

(b) The superintendent and the field clerk can use better judgment in connection with the use of supplies when the values are understood and on file.

(c) Estimates can be compiled, when wanted, by the representatives who are closest to the work.

The operator in deciding upon the system to adopt will probably be influenced by the amount of clerical work his property requires; that is, if the property is developed by contract and if the wells are not troublesome to operate, the foreman will probably be able to give considerable time to the "Warehouse" account, and if he is relieved of the pricing will be able to do without a clerk. If the warehouse does not have a great many transactions, one of the office clerks might be able to spare a part of his time for taking care of the

pricing and extensions. If more than one property is handled, one pricing agent could, of course, do all the pricing. If, on the other hand, the operator develops his own property, he will need a clerk at the property to take care of the pay roll and to act as warehouse clerk in order that proper facilities may be charged when receiving values from the warehouse. A clerk in a field office, controlling distribution of expense, often is an effective check on the foreman or superintendent.

If one clerk is unable to attend to the field office and also to the warehouse, a special clerk may be assigned to each. Then the office clerk can either price personally, or govern the pricing of the data furnished by the warehouse clerk, and the cooperation of the two may prove more satisfactory than that maintained between the warehouse clerk and the pricing clerk in the main office. However, the results of either system are the same, namely, the warehouse is relieved and facilities are charged when materials are given out, and when goods are taken back for redistribution, the entries are reversed.

Whether or not the "Warehouse" account is used, a copy of the purchase order should be furnished the field office in order that the field clerk may check off the receipt of the goods and verify the bill rendered.

In many fields the following routine is adopted to handle warehouse materials:

1. The goods are purchased, their receipt is checked by the field clerk, the bill of purchase is approved, and the original is forwarded to the general office for payment. The field clerk enters the details of the bill in a stock record. The main office, when auditing the bill, debits "Warehouse."

2. The workman presents a requisition to the warehouse keeper, requesting certain materials. The requisition, which states the intended use of the goods, is approved by a foreman.

3. The warehouse clerk gives out the goods, obtaining a receipt from the workman. Then he enters the items in the stock records and passes the requisition to the field office. The field office makes a copy of the transaction on the form desired by the main office and forwards it to the latter. The forms may be priced by either the field or the main office. After they have been priced and extended, the accountant makes a monthly entry of their aggregate, debiting their distribution and crediting "Warehouse."

A form for the requisition mentioned in 2 above follows. In place of using requisitions, a receipt (see Form 10, p. 65) for materials taken out may be used.

FORM 8 — *Form for warehouse requisition.*

No goods must be transferred from warehouse unless on written authority from superintendent or foreman.

.....Storekeeper.

Please deliver to.....the following

and charge to.....account.....Lease.....

Quantity.	Articles.	Weight.
.....		
.....		
.....		
.....		
.....		
.....		
.....		
.....		
.....		

Received above articles.

.....

a Convenient size, 3½ by 8 inches, bound in pocket-size books.

WAREHOUSE FORMS.

The "Warehouse" account is sometimes used to record the movement of only such supplies as are actually taken at the warehouse and delivered from it. The bills of purchase for property supplies are distributed in the voucher record to other accounts as well as to "Warehouse." The warehouse report is then not a complete record of supplies used during the period. An advantage of this system is that the warehouse is charged only with the materials that will be given out by it.

Again, the "Warehouse" account often is used as a clearing account for all bills of purchase for property use. All bills approved by the superintendent of the property are charged to "Warehouse" and all charges for material for facilities are credits to "Warehouse." When a bill includes items directly chargeable to a facility, the field clerk, at the time he approves the bill, issues a charge against that facility. A brief description of the bill and its reference is written on the charge, so that all of the details do not have to be entered in the bill. Advantages of using the "Warehouse" account as a clearing account are as follows: (a) One file contains all the monthly material charges against a facility; (b) both the field and the main office have a copy of the detail; (c) the bookkeeping in the main office is greatly simplified, not only in the voucher record, but also in the detailed cost records.

FORM 12.—*Form used in transmitting approved bills of purchase.^a*

PROGRESSIVE OIL CO.

To

Dear Sir: Inclosed please find invoices approved for payment as follows:

Reg.No.	Bill of—	Amount.	Direct charge.	Warehouse stock.
Totals, this sheet.....				
Total brought forward.....				
Month's total to date.....				

.....191..

Superintendent.

^a Convenient size, 9½ by 11 inches, with binding holes on left side.FORM 13.—*Form used to assemble monthly warehouse charges against each facility.^a*

..... warehouse. Facility..... No.

Month..... Account No..... Total.....

Direct charge.				Warehouse stock.			
Reg.	Bill of—	Description.	Amount.	Charge No.	Description.		Amount.

^a Convenient size, 8½ by 11 inches, with binding holes on left side.

Form 10.—This form is filled out when materials are delivered from the warehouse. The data are posted to Form 13 (storehouse-stock section) and to Form 14 (disbursed section). The forms are numbered as issued and after being posted are filed in numerical order as a permanent field record. A serial number should be used in connection with the numbering in order that the month may be specified. Thus, January may commence with 1001, February 2001, etc. This plan informs the clerk who posts the charges to Form 13 regarding the month of issuance from the warehouse.

Form 11.—This form is filled out when materials are returned to the warehouse account. Like Form 10 the form is posted to Forms 13 and 14. The forms are numbered as issued and after being posted are filed in numerical order as a permanent field record. The numbering system described under Form 10 is also applicable to this form.

Form 12.—This form is compiled in duplicate by the field clerk. After bills of purchase have been approved and the distribution marked on them, they are recorded on this form. It is advantageous to assemble as many bills as possible on each page of this form. Each bill is given a registry number. Under "Amount" is set forth the amount of each bill, and under "Direct charge" and "Warehouse stock" are shown the segregation. The month's total direct charges on Form 12, will, of course, agree with the month's total direct charges on Form 13. The field clerk attaches the original approved bills to the original of Form 12 and sends them to the main office. Both the field office and the main office file Form 12 in a loose-leaf binder, which constitutes an invoice register.

Form 13.—This form is used monthly for each facility. At the close of the month the direct charges and the entries for warehouse stock are added and the sum is shown at the top of the form. These are then recapitulated and forwarded to the main office (see Form 7). Form 13 is compiled in duplicate, the field office retaining the copy. Under "Direct charge" is shown the bill registry, name of sender, a brief description, and the amount of each bill or part thereof shown under "Direct charge" on Form 12. Under "Storehouse stock" is shown the charge number, detailed description, and amounts of Forms 10 and 11.

Form 14.—This form contains the data to support the book value of materials and stocks on hand in the warehouse. The "Received" section receives its postings from the bills approved by the superintendent for payment (other than direct charges), and the registry number is shown as the source of the posting. Credits from Form 11 also are chargeable to this section, as credited goods are returned to warehouse for redistribution. The "Disbursed" section receives its

postings from Form 11 only. This section is computed in units only, and the dollars and cents are not treated in the daily work.

ADVANTAGES IN USING FORMS.

Some of the advantages of the system described above are as follows:

1. The debits to "Warehouse" on the ledger agree with the totals shown on Form 12 for the month. Thus, the ledger account "Warehouse" is debited in the main office with the same amount that the warehouse clerk showed on his accounts.

2. When the direct charges, shown on Form 12, are balanced against the direct charges shown on Form 13, the accurate handling of a large volume of the business is assured, and with the least amount of red tape.

3. As the direct charges are charged and credited to the warehouse account in the same month, it follows that the warehouse balance refers only to stocks that will be accounted for by the use of Form 10.

4. The copy of Form 13 furnishes the superintendent with assembled cost data. The original furnishes the cost data to the main office and facilitates the handling of the unit-cost records (see p. 97).

5. The system is not a burden to the field-office clerk, because it is almost as easy for him to recopy the warehouse clerk's information on Form 13 as it would be to copy it on any other form required by the main office.

6. The field clerk computes his own warehouse balance by deducting the grand totals of Form 13 from the totals of Form 12, permitting him to tally frequently the value of the stock on hand against the warehouse balance.

WAREHOUSE EXPENSE.

In addition to the cost of supplies, including freights, there are warehouse expenses, namely, the clerk's salary and the upkeep of the warehouse, and teaming, if the property is away from the railroad. To take care of these expenses, some concerns use an account, "Warehouse expense." The estimated amount of this expense can be charged to the facilities supplied, by adding a percentage of the value of the materials given out. Again, the actual amount of expense can be arbitrarily prorated against the units supplied during the month. If the facilities supplied are charged, "Warehouse expense" should be carried to "Warehouse," as the credits to the latter account resulting from the charges to facilities include the percentage of cost to cover warehouse expense.

Another method of handling this expense is to charge the clerk's salary to a field-overhead account and to prorate the month's total on the same basis as for "General superintendence and office expense" (see page 51). The expense of teaming to the warehouse may likewise be distributed with "General teaming" as described in the discussion of clearing accounts. The result, of course, is not necessarily exactly correct, but it is probably as correct as that obtained by the method previously mentioned, and the procedure is exceedingly simple.

CHAPTER IX.

ACCOUNTING AS APPLIED TO PURCHASE AND USE OF TOOLS.

GENERAL CHARACTER OF TOOL ACCOUNTS.

Many varieties of tools are used in the development of oil properties. Some, such as the larger drilling tools and wrenches, are used for equipping work only; others are used entirely for operating work, and still others are used for both. Tool accounts are necessary to record the amount of investment in tools. The description and cost of each tool purchased should be entered in a suitable record, the total of which will support the ledger account "Tools." Form 14 may be used. Inventories should be taken yearly, the book value of the tools being adjusted to equal the inventory value. The adjustment invariably decreases the book value. This decrease is generally due to (a) wear and tear on the tools; (b) other causes such as obsolescence, theft, and shortage of count, the latter being caused by omission of items that should have been included in the inventory.

Generally speaking, obsolescence and losses from theft are charges against revenue. The inventory adjustment takes care of the value of the omitted items.

WEAR AND TEAR.

Wear and tear necessitates repairs and shortens the life of the tools. Throughout this chapter repair work is referred to as "repairs," decline in life as "depreciation," and a combination of the two as "wear and tear."

"Wear and tear" should be charged to the work responsible for it. Each equipping unit should stand its share in order that the share may be carried to "Profit and loss" as a part of the depreciation of the unit equipped. As the operating share is a current charge against "Revenue," this charge is preferably made each month if feasible. The accountant, in disposing of "Wear and tear," is confronted with the problem of determining the proportion chargeable to units being equipped and that chargeable to the operating accounts. A solution of the problem depends on (a) the practicability of keeping a record of the work done by each tool, in order that a charge may be made against the work for "Wear and tear"; (b) the practicability of determining the amount of depreciation of tools used.

The former deals with clerical work and with reports by the operating force to the clerical department; the latter with the life of the tools. It is almost impossible to keep track of the movement of tools and of each piece of work upon which they are used, as they are taken from point to point as needed and may be rarely on the tool-house platform. Many factors affect the life of tools. The usage that they receive and the quality of the materials in them are both variables, and it is impossible to estimate accurately what part of their life is given to each job on which they are used. Again, the appearance of tools is not a reliable index to their condition, as crystallization must always be reckoned with and as the rapidity with which they go to pieces, when once started, is not constant. Thus it is not practicable to record all the individual jobs that are responsible for the decrease in the value of the tools, nor to compute the decrease in life resulting from each short job. However, some provision must be made on the books to take care of wear and tear, or eventually the tools will be in such a worn-out condition that they will not support their book value.

When a concern has its equipping work done by a contractor, the accountant's problem is somewhat simplified for the reason that the tools used by the concern are mainly for operating an equipped property. "Wear and tear" is then clearly an operating charge. Small concerns of this type generally have modest tool accounts, and do not estimate monthly the decrease in the value and the life of tools. However, larger concerns, carrying substantial tool accounts, may desire to make monthly charges against revenue so that the inventory at the end of the year will not disclose a heavy shrinkage covering the repair work required and the depreciation.

REPAIR AND DEPRECIATION.

The following methods of accounting for "Repairs" and "Depreciation" will be of interest to concerns whose equipping work is done by a contractor.

(a) Charge the costs of repairs to "Tool maintenance."^a Treat this account as a profit-and-loss account. At the close of the year inventory the tools and price them at a fair value. (See p. 74.) Charge the shrinkage to "Profit and loss." Charge new tools to replace those worn out to "Tools." Charge tools lost to the job responsible, at the latest inventory value.

(b) Charge the cost of repairs to "Tool maintenance," and prorate the monthly aggregate to the different accounts on the basis of the relative amount of work done for them. Handle the inventory, renewals, and losses as in *a*.

^a "Tool maintenance" may be considered as "Miscellaneous" in Statement A, p. 64.

(c) Charge the costs of repairs to the operating account of each job done. Jobs responsible for an unrepaired condition of a tool should be charged with the repairing costs. If no particular job is responsible, charge the repairing costs to the job about to use the tool. Handle the inventory, renewals, and losses as outlined under *a*.

(d) Charge the cost of tools and all expenses in connection therewith to "Tools." Make a rental charge against each job, and credit the amount of the charges to "Tool rentals." Price the inventory at a fair value, apply the total rentals, and inventory to the credit of "Tools," and carry the balance to "Profit and loss."

(e) Charge the cost of repairs and renewals to "Tool maintenance." Charge a nominal rental against the account of each job using the tools, and credit the total to "Tool rentals." At the end of the year apply the difference between "Tool rentals" and "Tool maintenance" to the "Tool account." Carry the difference between its net balance and the inventory to "Profit and loss."

All of the methods mentioned result in the cost of "Wear and tear" being charged to "Profit and loss." Methods *b* and *c* are used to divide the cost of tool upkeep into operating accounts, which in turn are carried to "Profit and loss." Methods *d* and *e* result in charges against the accounts of jobs in which the tools are used, regardless of the damage done to the tools; also heavy charges in any one month against "Profit and loss" are eliminated, as the cost of repairing the tools is charged to either "Tools" or "Tool maintenance," to be taken care of at the close of the year. Under methods *a*, *b*, and *c* no provision is made for indicating the monthly decline in the life of the tools. This is done yearly at inventory time. However, methods *d* and *e* provide for this by making the rental rate sufficiently large. The writer favors method *a*.

The concern doing its own equipping work is obliged to view matters from a different standpoint. The cost of the wear and tear on the tools is much greater, owing to the increased number of tools used and the heavier work demanded of most of them. This cost applies to both equipment and operating accounts. The accountant, therefore, is obliged to arrange a system that will apportion the expense.

Any one of methods *c*, *d*, or *e* mentioned above may be used, as equipping as well as operating accounts can then be charged. The drawback to method *c* when used in connection with equipping is that the depreciation of the tools is all carried to profit and loss, even though equipping probably would be responsible for the greater part of the depreciation. The objection to methods *d* and *e* is that if the rental rates are excessive, profits will result from the rentals charged for equipping work. The writer favors method *f*, mentioned below, as it does away with charges for repairs and confines the charges for rentals to the depreciation account.

(f) Charge the cost of repairs to the account of the job responsible. Charge each job with a rental to cover depreciation. Credit the rentals to "Reserve for Tool Depreciation." At the end of the year inventory and price at fair value. Check the amount of the inventory against "Tools" less "Reserve for depreciation." Carry the difference to "Profit and loss." Charge the cost value of the tools renewed to "Tools."

Charging the cost of tool repairs to the account of a job is not necessarily more unjust to cost accounts than is the rental charge prescribed in methods *d* and *e*. If the cost of tool repairs is charged against a job, a tool may be turned back by a job in a better or a worse condition than that in which it was when received. Under methods *d* and *e*, a rental charge is imposed against a job whether or not the tools suffer unduly in wear and tear while being used on it.

Much depends upon the meaning of "fair value." It may be argued that to a "going" concern the value of a tool is the cost of its replacement. The laws of supply and demand might affect this assumption as second-hand tools might be satisfactory for replacement. When equipping work is completed, the tools may be sold, when their value is the sale value. Probably a fair value would be not less than 40 to 60 per cent of the cost value, as long as the tools are in fair serviceable condition. It is impracticable to endeavor to estimate accurately the percentage of life remaining in a tool.

Some concerns go to considerable work to take care of rental charges and repair bills. They number each heavy tool with steel stamps and endeavor to record its movement by tool number. The advantages gained are doubtful, and the work involved is intricate.

As previously stated, it is impracticable to record all the individual jobs that are responsible for the decrease in the value of tools, and it is also impracticable to compute the decline in life resulting from each short job. However, the accounting methods described mention the charging to jobs of repairs, rentals, etc. The "jobs" to be included are the relatively larger and more important ones.

TABULATING TOOLS.

Often much work may be saved by tabulating the tools required for each kind of work and estimating the amount of such work that they will do. This procedure reduces calculations to a unit basis. When work of a certain kind is done, the amount of that work at the unit rate represents the rental. Of course one tool may be used more than estimated, but then another tool will be worked less and the results balance off. The tool account as a whole is little affected. The following statement is an example of the application of this plan.

Cables and lines are charged to the equipment of wells when rigged and are credited to wells when completed at an estimated value. Casing is considered a part of warehouse account until "landed" in the hole; then it is charged to the well. Costs of repairs to casing damaged by the well are also charged to the well.

Tabulation of drilling tools, showing cost and estimated life of each tool.

DEPRECIATION ON TOOLS LOANED BY "TOOL" ACCOUNT TO WELLS BEING DRILLED.

Repairs are charged to wells responsible.

Tools lost in hole are charged to wells at an average inventory value of their description.

Discarded values are charged to the reserve for tool depreciation and are credited to the tool account at cost value.

	Cost, new, f. o. b. property.	Estimated life, number 2,000-foot wells.	Cost per well.
1 set 6-in. Ideal rig irons.....	\$600.00	10	\$60.00
1 sand reel and lever.....	106.00	10	10.50
1 W. & W. pitman (steel).....	52.50	15	3.50
1 Ideal calf wheel shaft.....	111.36	10	11.14
1 10½-in. by 12-in. Ajax engine.....	333.05	10	33.30
1 Page pump.....			
1 2-in. by 7-ft. temper screw.....	45.00	10	4.50
1 extra set manila rope clamps.....	15.03	10	1.50
1 New Era rope socket.....	12.12	10	1.21
1 W. L. rope socket (2 by 3 by 7).....	9.40	15	.63
1 W. L. rope socket (3 by 4 by 7).....	14.45	10	1.45
1 set 6½ by 8 in. jars (3 by 4 by 7).....	57.45	3	19.15
1 set 5½ by 8 in. jars (2 by 3 by 7).....	45.00	5	9.00
1 4½-in. by 32-ft. stem.....	83.44	15	5.56
1 3½-in. by 30-ft. stem.....	49.84	15	3.32
2 15½-in. bits.....	242.42	10	24.24
2 12½-in. do.	161.88	8	20.23
2 10-in. do.	120.25	7	17.18
2 8½-in. do.	92.50	5	18.50
2 6½-in. do.	58.66	5	11.73
1 10-in. underreamer.....	311.50	15	20.77
1 8-in. do.	266.00	15	17.73
1 6½-in. do.	221.00	15	14.73
1 dressing block.....	47.00	15	3.13
1 11½-in. by 20-ft. dart bailer.....	55.00	4	13.75
1 9½-in. by 20-ft. do.	40.00	4	10.00
1 7½-in. by 40-ft. do.	60.00	5	12.00
1 6½-in. by 40-ft. do.	50.00	5	10.00
1 4½-in. by 40-ft. do.	40.00	5	8.00
1 derrick crane.....	55.10	15	3.67
1 Barrett jack and circle.....	53.47	10	5.35
1 set 4½-in. tool wrenches.....	35.78	10	3.58
1 set 3½-in. do.	48.80	10	4.88
1 Barrett swivel wrench.....	29.25	10	2.93
1 set 15½-in. casing tongs.....	80.00	10	8.00
1 set 12½-in. casing tongs with bushings 10 in., 8½ in., 8 in.....	100.00	10	10.00

Tabulation of drilling tools, showing cost and estimated life of each tool—Continued.

	Cost, new, f. o. b. property.	Estimated life, number 2,000-foot wells.	Cost per well.
1 Neily spudding shoe.....	\$6. 50	10	\$. 65
1 15½-in. steel drive head.....	56. 50	15	3. 77
1 12½-in. do.	40. 77	15	2. 72
1 10-in. do.	29. 40	10	2. 94
1 8½-in. do.	22. 34	8	2. 79
1 6½-in. do.	19. 00	8	2. 37
1 4½-in. drive clamp.....	25. 69	6	4. 28
1 3½-in. do.	20. 55	8	2. 57
1 15½-in. elevator.....	237. 00	20	11. 85
1 12½-in. do.	168. 00	20	8. 40
1 10-in. do.	146. 50	10	14. 65
1 8½-in. do.	43. 85	10	4. 39
1 6½-in. do.	79. 00	10	7. 90
1 15½-in. spider.....	95. 00	20	4. 75
1 12½-in. do. with slips 10 in., 8½ in., 6½ in.....	195. 23	20	9. 76
1 32-in. triple casing block.....	57. 81	10	5. 78
1 6-in. hook.....	57. 95	10	5. 80
1 casing wagon.....	8. 00	10	. 80
1 No. 4 Star blower.....	20. 04	8	2. 50
1 1-ton chain hoist.....	22. 40	10	2. 24
1 2-ton do.	37. 00	10	3. 70
1 anvil.....	23. 00	10	2. 30
1 No. 16 Vulcan chain tong.....	18. 40	10	1. 84
1 No. 33½ do.	4. 00	10	. 40
1 set No. 1 A Toledo stocks and dies.....	16. 25	10	1. 63
1 No. 7 Little Giant screw plate.....	17. 50	10	1. 75
1 No. 2 Armstrong stocks and dies.....	3. 60	10	. 36
1 12 in. by 90 ft. belt.....	101. 91	3	33. 97
Bit gages, hammer, saw, small tools, etc.....	50. 00	3	16. 66
	5, 326. 44		568. 68
Fishing tools not listed above.....			35. 00
Total for a 2,000-ft. well.....			603. 68
Average cost per foot.....			. 30

At the time the depreciation is computed at 30 cents a foot on the final depth of the well, plus such part of the hole as was lost during drilling, the amount is charged to the cost of the well and is credited to "Reserve for tool depreciation." A stock sheet "Reserve for tool depreciation" is opened and all depreciation items of this nature are entered thereon. The total of this credit sheet is deducted from the value of the remainder of the stock sheets and the difference supports the tool-account balance. At the end of each fiscal year the inventory is taken and written on new sheets.

The inventory prices represent fair value. Because the figure of 30 cents a foot is judged to be approximately correct, the standing value should support the book figure.

Tools alike in size and dimension are carried on a stock sheet (Form 14) at inventory value. When a tool is lost in a well its value should be charged to the well that is responsible for the loss. The value of the item is obtained by referring to the tabulated statement to determine the depreciation cost of the tool per well and multiplying that cost by the number of wells that have been drilled, which is shown on the stock sheet under "Reserve for tool depreciation." Deduct the result from the value of all the tools shown on its stock sheet and divide by the number on hand, including the tool lost. An example follows.

Manner of calculating value of a lost tool.

Lost, one 12-inch bit.

Stock sheet indicates. On hand, seven 12½-inch bits, carried at \$560.

Reserve for tool depreciation sheet indicates. Two wells completed.

Basis of depreciation indicates. Depreciation per 2,000-foot well for 12½-inch bits, \$20.23.

Deduct \$40.46 from \$560 and divide by 7 to obtain the value of the 12½-inch bit lost.

SMALL TOOLS.

Small tools may be charged, when purchased, to the work on which they are to be used or to an asset account such as "Tools" or "Warehouse." The former method is, of course, followed when neither a "Tool" nor a "Warehouse" account is used. Charges against the work may be made by the asset account also when tools are given out. When the value of tools is carried in an asset account, it is, of course, desirable that this account be credited when tools are worn out, lost, or destroyed. As small tools do not represent a large investment, and it is hardly practical to estimate their percentage of good, they are generally, if in serviceable condition, valued at inventory time at cost. It is often difficult to draw the line between large and small tools and many operators include both under "Tools." Other operators carry small tools as part of "Warehouse." When given out for permanent use, these tools are charged to that work. When they are given out for a short job, a tool receipt (see Form 15) is taken from the employee or his foreman; when the tools are returned, the receipt is canceled, and no entry is made on the records unless there is a shortage in the count of serviceable tools through their being worn out or lost.

CHAPTER X.

BOOKS OF ACCOUNT.

GENERAL NATURE OF ACCOUNT BOOKS.

There are a great many methods of keeping books; even those that are supported by the same accounts and the same field systems may not be alike. The methods used vary with the bookkeepers, each of whom generally has some special system that he prefers. The points considered most important by one bookkeeper may not be considered so by another. A well-balanced set of books is comprehensive and direct in its functions, and in the general ledger it handles, under controlling accounts rather than under individual accounts, data that otherwise would involve numerous entries and postings.

Both the management and the bookkeeper of a small concern can profit by the keeping of a simple and comprehensive set of books. The management is enabled to study the progress of the business from the books themselves and often can offer the bookkeeper practical suggestions, so that the books may better express the facts of the business.

As a concern grows its books are generally intrusted to an expert who attends to bookkeeping only. As a result the books become more complex and are less easily comprehended by the management. Then the latter studies the business from the accountant's reports.

The accounts payable can be expressed by an account such as "Accounts payable" or "Audited vouchers," and, generally speaking, the accounts that represent current assets are not numerous. It follows that the bulk of the bookkeeping lies in the handling of the equipment units and the cost of operating them.

All bookkeepers should keep a cashbook and a ledger; the former for the cash transactions and the latter to record, under each account, the outlay upon it. Some oil companies use a journal: through this they work the accounts from the pay-roll distribution and from the bills of purchase or from warehouse distribution into the ledger. A voucher register often is used either in addition to or in place of the journal. Sometimes the cashbook, journal, and voucher register are combined in one book. When this book is used, the entries are made when the bills are paid. This plan is not desirable, as explained in Chapter IV, page 22.

The writer does not propose to discuss bookkeeping methods at length; but he offers the following statements for the purpose of aiding the producer whose business does not warrant an expert bookkeeper and of interesting large companies using bookkeeping systems that are not entirely satisfactory.

BOOKS SUITABLE FOR SMALL COMPANIES.

The following set of books will be found simple, comprehensive, and easy to keep. Each book has a distinct purpose. The printed forms required to support the books are a cash voucher and a journal voucher. A check book, of course, is necessary. The books themselves comprise cash book, voucher register, and ledger. It is assumed that all collections are deposited and that all payments are made by check.

CASH VOUCHER.

When bills have been approved and are ready to be taken into account, they should be listed on the cash voucher (Form 16). The date and amount of each bill should be specified. If there is enough room in the body of the voucher, the data of the bills or the description of the indebtedness may be written there. The distribution of the bills is indicated on the back of the form.

After being compiled the voucher is approved by those in authority and is entered in the voucher register and given a number. At the time the voucher is taken into account all its supporting papers and data are marked "Paid," and the number of the voucher is shown upon them. After this is done, the data are detached from the voucher and filed away pending the return of the latter after payment.

When payment is made, a check is drawn for the amount of the voucher. The voucher number is written on the check stub. The check number is written on the voucher. The date of payment, payee, voucher number, and amount are recorded on the right-hand or credit side of the cash book. Then the voucher is forwarded to the payee, who receipts and returns it. The bookkeeper looks up the supporting data, fastens them to the receipted voucher, and files the papers according to the voucher number. Thus the final use of the voucher is as a wrapper to protect the papers filed and a receipt to vouch for their payment.

Vouchers, whether cash or journal, may be numbered consecutively when entered in the voucher register. Again, the voucher register for each month may begin with a serial number, indicating the month, so that entries in a later month can be numbered without awaiting the close of the current month. Example: January, 1001; February, 2001; March, 3001; etc. See Forms 20, 21.

FORM 16. — *Voucher for cash receipts*

Face.

PROGRESSIVE OIL CO.,

To

Dr.

INCA BUILDING,

TULSA, OKLA.

Address

Date of account.		\$	Cents.

Approved for payment

Paid by check No.

Received from

Dollars.

In full settlement of above account.

Date received.....

Kindly sign in ink and return to above address.

Reverse.

PROGRESSIVE OIL CO.	
Voucher No.	
Name	
Registered	
\$	
Distribution.	Amount.
Total	

a Convenient size, 7½ by 8½ inches.

FORM 18.—Form for check stub and specimen entries on reverse side.

FACE OF CHECK STUB

No.	\$
Date	191 ..
Pay .....	.....
.....	
Voucher No. ....	.....

REVERSE OF CHECK STUB.

Balance forward.....	\$2, 862. 00
Deduct checks Nos. 97 and 98.....	237. 00
Balance forward.....	2, 625. 00

Reconciliation with bank.

Stub balance.....	\$2, 625. 00
Checks outstanding:	
No. 71.....	\$10. 00
No. 73.....	8. 71
Total outstanding.....	18. 71
Balance as per bank statement.....	2, 643. 71

CASH BOOK.

The purpose of this book (Form 19) is to keep a record of the cash receipts, the cash disbursements, and the cash balance. The date of each entry should be the date of the transaction. The funds received should be entered under receipts and in the name of the account which paid them. These entries post from the receipt side of the cash book to the right-hand side (credit side) of their account in the ledger. The cash disbursements are entered under that heading in the cash book. The monthly total of cash disbursements posts to the left-hand side of the account "Audited vouchers" in the ledger. A new page in the cash book should be started each month.

VOUCHER REGISTER.*

Among the purposes served by the style of voucher registers shown here as Forms 20 and 21 are the following:

Dividing the business transactions into months, one page, or more if necessary, being allotted to each month.

Distributing the amounts of the transactions to their proper accounts so that the total of each account when obtained may be carried to the ledger.

* Also known as "Voucher record" and "Voucher journal."

INSERT

FOLDOUT

HERE



Voucher registers are better if loose-leaf; then if entries have to be made in other months than the current one, the bookkeeper will not have to leave blank pages between months in order to be sure of having enough pages for completing the current month.^a Books that can be used as voucher registers can be purchased containing up to 24 columns. The bookkeeper heads the many columns with the names of the accounts used, and the distribution of the cash and journal vouchers is extended to these columns. It is well to use the four columns at the extreme right for individual posting, as there may not be columns enough to allow a heading for each account.

The amount of each cash voucher is entered under "Audited vouchers credit." When all entries are in, the total of each column is drawn down. The debits are posted to the left-hand or debit side of their account in the ledger; the credits to the right-hand or credit side of the ledger.

The voucher record for a month may remain open until late in the following month—that is, until all its bills and journal entries have been entered. When the record is closed, the page presents a chart of the month's entries, whether paid or not, so that the cost accounting is correctly handled.

LEDGER.

The ledger is an account book that has a page for each style of account (Form 22) used by the company and to which each account of the voucher register and cash book is posted. Inasmuch as the voucher register is in balance before being posted, the entries made from it to the ledger do not disturb the balance of the latter. The cash book posts to the ledger, the left-hand page of the cash book posting to the right-hand side of the proper accounts in the ledger, and the right-hand side of the cash book posting to the left-hand side of the "Audited voucher" account in the ledger. The increase in cash on hand makes up the difference between the ledger postings of cash receipts and cash disbursements, and the cash on hand, therefore, must be added to the total of the ledger accounts in order that the trial balance may be obtained. Trial balances are taken from the ledger.

^a The voucher register for each month may include transactions during that month or delayed bills of preceding months; however, it must not include transactions of a later month.

FORM 22.—*Postings from cash book (Form 19) and voucher register (Form 20).*

TAXES.

1918.

May	31	.....	V. R. 70	\$68.05	.....	.....	.....	.....
June	30	.....	V. R. 71	68.05	.....	.....	.....	.....

FIRE INSURANCE.

1918.

May	31	.....	V. R. 70	\$74.02	.....	.....	.....	.....
June	30	.....	V. R. 71	75.02	.....	.....	.....	.....

ADMINISTRATIVE.

1918.

May	31	.....	V. R. 70	\$965.17	.....	.....	.....	.....
June	30	.....	V. R. 71	962.12	.....	.....	.....	.....

FUEL.

1918.

1918.

May	31	.....	V. R. 70	\$310.62	June	30	.....	V. R. 71	\$125.65
June	30	.....	V. R. 71	425.65	.....	.....	.....	.....	.....

MISCELLANEOUS.

1918.

May	31	.....	V. R. 70	\$219.25	.....	.....	.....	.....
June	30	.....	V. R. 71	193.43	.....	.....	.....	.....

TEAMING.

1918.

May	31	.....	V. R. 70	\$125.16	.....	.....	.....	.....
June	30	.....	V. R. 71	252.12	.....	.....	.....	.....

WATER.

1918.

May	31	.....	V. R. 70	\$150.00	.....	.....	.....	.....
June	30	.....	V. R. 71	150.00	.....	.....	.....	.....

SUPPLIES.

1918.

May	31	.....	V. R. 70	\$1,701.23	.....	.....	.....	.....
June	30	.....	V. R. 71	1,450.00	.....	.....	.....	.....

LABOR.

1918.

May	31	.....	V. R. 70	\$1,701.23	.....	.....	.....	.....
June	30	.....	V. R. 71	2,865.10	.....	.....	.....	.....

AUDITED VOUCHERS.

1918.

1918.

May	31	.....	C. B. 91	\$3,030.83	May	31	.....	V. R. 70	\$5,327.16
June	30	.....	C. B. 93	2,054.24	June	30	.....	V. R. 71	9,320.35

CASH DISCOUNTS.

When cash discounts are taken by an oil company, the face of the voucher (Form 16) should show the gross amount of the bill paid, the amount of discount taken and the net amount of payment. The receipt should be for the net amount; that is, the amount of the check sent the payee. On the back of the voucher the amount of the bill settled for should be shown. When the voucher is entered into the voucher register, the amount of distribution should be that shown on the back of the voucher, to wit, the actual amount of the bill as rendered. When the cash discount is entered in the cash book, it should be in a separate column, distinct from the net amount of payment. The net amount of payment plus the amount of discount, when posted to the debit of the audited vouchers, will balance the amount of the voucher as entered in the voucher register.

Some companies approve a system of crediting the account of every firm from whom purchases are made with either the amount of each bill or the monthly total of the bills as rendered; thus they carry a ledger account with each concern they deal with, believing that this plan will minimize duplicate payments.^a The voucher system guards against duplicate payments by the bills being checked, when vouchered, against the monthly statement received from the payee. Either system should take into account only the original bills that have been approved by the company's representative who received the goods. As entries in either system are based on bills approved in the same manner, it follows that the responsibility for duplicate payment rests with the first approver, rather than with the bookkeeper.^b

When the first-mentioned system is used, the account of the concern rendering the bill receives credit, and the management, unless it approves each entry, has neither a check on the legitimacy of the entry nor on the service that the bill covers.

Under the voucher system the executive concerned has the actual bills before him when approving the vouchers; when payment is made, the check that he signs supports the amount of the voucher that he has approved. The voucher system, therefore, not only permits the management to check the entries going into the books and to observe for what purpose the money is being expended, but also prevents payments being made without supporting bills. All bills and data that the bookkeeper places before the management to support each voucher should carry the number of that voucher.

Practice has demonstrated the worth and efficiency of the voucher system.

^a When the ordinary journal is used in this connection considerable journalizing has to be done, more accounts are handled in the ledger, and there are more chances of error in the trial balance.

^b See page 62, third paragraph.

BOOKS SUITABLE FOR LARGER COMPANIES.

As the business of an operator increases, the books described in the preceding pages will prove inadequate.

CASH BOOK.

If the operator carries cash in more than one bank, a new cash book with separate columns for each bank may be used. The accounts entered are the same, but the separate amounts are entered under the headings of the several banks. Books containing several columns can be purchased of any stationer. If the number of banks is larger than can be handled individually in the cash book, then an account with each bank may be carried in the ledger. If this is done, the ledger will reflect the balance of each bank, and the receipts and disbursements must be posted in the ledger daily.

Again, a check register may be used. This register should set forth the essential data of each check and the amount for which it is drawn, and the amount should be extended to the column headed by the bank in question. The total of the amount of checks for a month may be posted from the check register itself to the ledger, or the total may be shown in one lump sum on the credit side of the cashbook and from there carried to the ledger. As the check register is a record of the cash disbursements segregated into banks, it represents the credit page of the cashbook. Many accountants use the latter system in order that the relation of the check register to the cashbook may be evidenced in the latter.

VOUCHER REGISTER.

As accounts increase, the voucher register also proves inadequate. The number of its columns becomes insufficient and the sundry column is too crowded. To alleviate this condition the capacity of the voucher register must be increased. The following suggestions may be of service when such increase is necessary:

1. If the voucher register is a bound volume, the four right-hand columns, ordinarily used for individual postings, can be cut off and the distribution spread over four pages instead of two.

2. If the register is loose-leaf, sheets with fewer columns can be inserted between the full-sized sheets; then a condition similar to that just described will result, except that an indefinite number of columns is available.

3. Several voucher registers that support a controlling register may be used. The controlling voucher register records all vouchers and extends their distribution to controlling accounts. A separate voucher register for each controlling account segregates its distribution. With this system each voucher will be entered in the controlling register and also in as many subregisters as its distribution affects.

to the payee before it is entered in the cash book. This style of cash voucher greatly expedites the work of the voucher clerk and the cashier.

FORM 25. *Form of cash voucher (in duplicate)*^a

[Part for payee.]

[Perforated.]

Progressive Oil Co.

Voucher No. Check No.

2433 California Street.

SAN FRANCISCO, CAL.

[Indorsement of this check is an acknowledgment of payment received in full settlement of account as shown on statement below. No other receipt required.]

BANK OF CALIFORNIA
(National Association)

Pay to the order of

Dollars (\$)

Progressive Oil Co.

Secretary.

Vice President.

[Perforated.]

Progressive Oil Co.

Payee will please detach and retain.

Paid by check No.

Date of account. For

\$

[Part retained by auditing department.]

[Perforated.]

Progressive Oil Co.

Voucher No. Check No.

2433 California Street.

SAN FRANCISCO, CAL.

[Indorsement of this check is an acknowledgment of payment received in full settlement of account as shown on statement below. No other receipt required.]

BANK OF CALIFORNIA
(National Association)

Pay to order of

Dollars (\$)

Progressive Oil Co.

Secretary.

Vice President.

Progressive Oil Co.

Payee will please detach and retain.

Paid by check No.

Date of account. For

\$

Correct.

Approved.

Approved

^a As actually printed, the form is 8 $\frac{1}{2}$ by 15 $\frac{1}{2}$ inches, and the matter is so placed that when the form is folded the "part for payee" is on top of "part retained by auditing department," the perforation indicated at the top of each part forming one perforated line. When form is thus folded, part for payee is same as Form 16, or 7 $\frac{1}{2}$ by 8 $\frac{1}{2}$ inches, and part retained by accounting department is 7 $\frac{1}{2}$ by 8 $\frac{1}{2}$ inches, the words "Correct," "Approved," "Approved," showing below the part for payee. Form works well with window envelopes. Not practical if duplicate receipts are required.

OPERATING ACCOUNT - REVENUE AND EXPENSES.

[illegible]

FORM 27.—Another form of detail ledger page.^a

[illegible]

FORM 28.—*Another form of detail ledger page.*^a

Amount authorized, \$..... Remarks

[illegible]

a Convenient size, 9½ by 12 inches.

It is particularly helpful to an accountant when one set of books is used to record the transactions of several partnerships or to take care of the accounts of several properties run by partners owning a different number of shares in each property.^a The cash collections may all be deposited to the bank account of the trustee, the bills of each property paid either on the voucher form of the trustee or that of the property in question, and the distribution carried to the detailed ledger pages. It is customary for the trustee to furnish the partners with monthly reports and to make a settlement with each partner when profits are to be divided. When many statements have to be compiled by the accountant, his work is somewhat simplified by the compactness of the ledger sheets.

Plan 51 (p. 91) slightly resembles the system described above. In both the detail of the accounts is built up on ledger pages prior to the trial balance. In plan 5 a page of the subledger is allotted to each unit of expense for which detail is desired, and on each page is set forth the nature of expense covered by each voucher. Recapitulations of the monthly entries are carried to the general ledger in terms of controlling accounts. This procedure minimizes the number of accounts contained in the trial balance of the general ledger, as that includes only controlling accounts. In the system under discussion the distribution of expense and revenue accounts and also of equipping wells is made on the ledger page itself. The trial balance, therefore, includes more accounts to take care of equipment units and less to take care of the profit and loss accounts. Any statements required can be compiled rapidly under either system. The work of bookkeeping, however, can be done quicker under the system requiring fewer ledger pages.

Form 26 represents a loose-leaf sheet covering the operations and Form 27 a sheet covering the equipment. Form 28 may be used in lieu of Form 27. The net balance or profit is shown monthly under "Net balance."

BOOKS AND METHODS FOR RECORDING COSTS OF EQUIPMENT UNITS.

Mention has been made of carrying in the operator's records the cost of each unit equipped. The ease with which this can be done should prompt every operator to do it. Among the many methods having merit are the following:

(1) If the concern is small an account with each unit may be carried on the main ledger, that is, there may be a ledger page for

^a When properties are worked on a royalty basis and the lessor has the right to inspect the accounting in connection with his property, it is the accountant's aim to keep all data pertaining to the property separate from the accounting of other properties worked by the company.

"Oil wells," "Well No. 1;" "Oil wells," "Well No. 2," etc. The detail of each unit may be shown on its ledger page by individually posting each item of expense to it.

(2) Expenditures may be posted to controlling accounts in the ledger and after the trial balance has been taken and the financial statements completed, the controlling accounts may be detailed into their units and the units in turn detailed. The key to the distribution of the labor and material portions of the controlling accounts will be the recapitulation of the pay roll and the warehouse report. (See Form 7.) If no warehouse report is used, the distribution of the invoices will be necessary.

(3) If a warehouse account is used, the distribution of the controlling accounts may be detailed by the use of Form 29, which provides an abstract of the unit's cost expressed in monthly totals. In case the detail of a unit is desired, the accountant refers to this form, determines the months of the charges that substantiate its total, and refers to the warehouse reports for the detail. Labor, of course, in this instance is "Labor."

The advantage of this system is that the accountant in the main office is not obliged to rewrite data, because Form 29 refers him to data already compiled.

(4) If a warehouse account is not used, then the detailing of the controlling accounts may well be done on loose-leaf ledger sheets. A page is allotted to each unit, and each entry on the page should state the voucher number, nature, and amount of the charge. Labor would be one of the items. When these pages are compiled, the accountant should be sure that the total of each month's detailing will support the amount carried for the same month to its controlling account. Forms 27 and 28 are suitable for this work.

(5) The system outlined under section 5, page 91, may be followed, the distribution of each voucher may be carried to the subledger, and the monthly outlay on each unit recapitulated so that its amount may be carried to the ledger in controlling accounts.

(6) The system outlined on pages 94 to 96 may be followed, the ledger pages being subdivided into columns. When the distribution of the vouchers is posted to the ledger, it is segregated into the unit data as provided by the headings of the columns.

Each of these six methods is suitable in its place. The writer favors those that cause the accountant to build up the detail before he can draw off a trial balance. This keeps the unit-cost data always up to date.

FORM 29.—Form for detailing controlling accounts when "Warehouse" account is used.

PROGRESSIVE OIL Co. Facility..... Acct. No.....
 Date commenced..... Depreciation. Auth.....
 Date completed.....
 Remarks.....

	Labor.	Materials and sundries.		Labor.	Materials and sundries.
1914.			1917.		
January.....			January.....		
February.....			February.....		
March.....			March.....		
April.....			April.....		
May.....			May.....		
June.....			June.....		
July.....			July.....		
August.....			August.....		
September.....			September.....		
October.....			October.....		
November.....			November.....		
December.....			December.....		
1914 total.....			1917 total.....		
Brought forward.....			Brought forward.....		
Total to date.....			Total to date.....		
1915.			1918.		
January.....			January.....		
February.....			February.....		
March.....			March.....		
April.....			April.....		
May.....			May.....		
June.....			June.....		
July.....			July.....		
August.....			August.....		
September.....			September.....		
October.....			October.....		
November.....			November.....		
December.....			December.....		
1915 total.....			1918 total.....		
Brought forward.....			Brought forward.....		
Total to date.....			Total to date.....		
1916.			1919.		
January.....			January.....		
February.....			February.....		
March.....			March.....		
April.....			April.....		
May.....			May.....		
June.....			June.....		
July.....			July.....		
August.....			August.....		
September.....			September.....		
October.....			October.....		
November.....			November.....		
December.....			December.....		
1916 total.....			1919 total.....		
Brought forward.....			Brought forward.....		
Total to date.....			Total to date.....		

convenient size, 9 by 11 inches. Binding holes at left. Casing record and other pertinent data may be shown on the reverse of this form.

CHAPTER XI.

COST STATEMENTS.

The concern that subdivides its operating costs has taken a step toward a cost statement.

Statement A mentioned in Chapter V shows a good subdivision of costs for the company whose wells give little trouble and whose production expenses are, therefore, practically all for the purpose of pumping oil. If one property is worked, the "Profit-and-loss" account constitutes a cost statement. If more than one property is worked, Form 30 will prove satisfactory.

Statement B of Chapter V deals with operating accounts that describe the nature of the work performed. As this statement applies to the company having wells that are troublesome to operate these accounts represent more expense for each well. Some companies having such wells maintain a record of individual-well operating costs and of individual-well productions. The objects sought are to be able to determine when to abandon an unprofitable well and to detail the well expense so that others beside the superintendent may study the results of his methods. A cost statement to cover Statement B is shown in Form 31. This statement is divided into "Oil-well expenses" and "General expenses." It may be on one large sheet, or on two smaller sheets that can be bound together in book form if desired. If two sheets of the same size as the financial statement are used, they may be bound with it.

Form 31.—Form for profit-and-loss statement showing details a

STATISTICAL STATEMENT.

Showing cost of operating wells on property of Progressive Oil Co., month of June, 1918.

Description.	Oil-well expenses.				General expenses.			Total field expense.	Barrels produced.	Cost per barrel.
	Repairs.	Cleaning.	Redrilling.	Pumping.	Total.	General property expenses.	Superintendence and office.	Storage and shipment.		
<i>Brought forward...</i>	129.30	470.30	383.45	938.45	2,081.50				4,325	
<i>Johnson well, 14...</i>		249.60	432.16		731.76					
16	119.12				119.12					
22	96.30			45.60	71.90				125	
23				46.40	46.40				210	
24				46.40	46.40				115	
25				35.60	35.60				180	
26	74.50	187.72		46.40	388.62				15	
29				46.40	46.40				270	
30				46.40	46.40				300	
31				46.40	46.40				115	
32				46.40	46.40				170	
33				46.40	46.40				195	
34				46.40	46.40				211	
35				46.40	46.40				240	
36				38.90	38.90				100	
	119.12	907.62	967.61	1,511.65	3,606.00	998.27	850.00	3,179	5,000	\$0.34

a Conventional 19½ x 11 by 1½ inches. This form may be divided into two forms—one comprising all matter up to and including the "Total" column and another two columns.

b Barrel produced "and cost per barrel," and the other including all matter to the right of the total column. If the form is divided, each part may be 8½ x 11 inches.

OIL-WELL EXPENSES.

To segregate well operating costs into well units is not difficult as regards accounting. The course followed depends on the method the accountant uses for handling labor and material. The data to support these costs must be furnished the accountant by the field clerk, and the latter, therefore, must obtain on the daily time card and on the warehouse requisitions not only the account involved but also the unit number. As an employee knows the number of the well at which he is working, the obtaining of the necessary information should not be difficult. The recapitulation of the pay roll and of the warehouse report, as shown on Form 7, may set forth each unit's cost under headings that serve as controlling accounts. After the trial balance is taken these unit costs may be referred to and combined in one total, which should be shown under the proper heading of each well number, as indicated in the cost statement printed as Form 31.

Often much benefit results from the study of individual well costs. Such a statement indicates what wells are giving the most trouble and the nature of that trouble; also it brings together an accumulation of data that will prove a reliable guide. The statement may substantiate or contradict the verbal opinion of the superintendent as given to the manager during occasional visits to the property. Managements may come and go, but the books go on indefinitely. An incoming management is entitled to the detailed record of its predecessor and the stockholders are entitled to the records of both

REPAIRS.

As mentioned before, the production of a well depends on the possibilities of the oil strata being drained, not on the outlay made for repairs on the wells. As the production must be limited, maximum profits are to be sought through decreased operating expenses. Nothing helps to keep these expenses at a minimum more than to compare them with the results being obtained; particularly when no expenditure, however large, can result in a production greater than the underground possibilities.

CLEANING AND REDRILLING.

Cleaning out and redrilling may be important expense items. While such work is in progress the expense increases and the production generally stops. Inefficient methods of pumping often account for an excessive amount of cleaning. If the oil sand is soft, rapid pumping may suck the sand into the well, and a cleaning-out job will have to be done. Eventually as the oil is recovered there is an adjustment of the oil sands around the bottom of the well, and the casing is apt to collapse or be damaged. Although the nature of the oil strata makes this condition possible, yet the possible damage may be greatly aggravated by unintelligent pumping methods.

Proper pumping methods—that is, methods that have proved efficient—may mean less production a day, but more producing days in a month; whereas unwise pumping may mean a higher daily production for a limited period,^a more pumping time lost per month, and the expense of repairing the well bottom. Oil men generally agree that producing wells should not be capped, because capping affects the infiltration of the oil from the sand. It follows that a pumping well is not benefited when production is stopped on account of cleaning or other work. Redrilling often reduces the production of a well. The writer does not contend that efficient pumping methods at settled wells will eliminate sand troubles and redrilling, but experience has demonstrated that wells do better when nursed than when forced.

PUMPING.

Pumping costs of individual wells are generally a pro rata charge of the cost of operating the power plant. A method of prorating the charge for each well is given under Chapter VII, page 51.

GENERAL EXPENSES.^b

GENERAL PROPERTY EXPENSES.

As explained in Chapter V, page 37, the general property expense account is an accumulation of operating expenses other than those for oil wells, superintendence and office expense, and storage and shipment. If a property is large the account becomes bulky and it should be detailed. This can be done easily by means of account numbers, as explained on page 107. If "General property expenses" is known as Account 5, then each branch of its detail may be lettered as follows: Teaming, 5a; lease work, 5b; water system, etc., 5c; building repairs, etc., 5d. Such lettering can be placed on the individual time sheets and on the requisitions for material. If the account is detailed, the pay roll and the recapitulations of warehouse disbursement contain the subdivisions of "General property expenses." If Form 32 is used, the total of "General property expenses" can be shown under its proper heading, and the total substantiated by a supplemental sheet in which 3a, 3b, 3c, etc., can be detailed.

SUPERINTENDENCE AND OFFICE EXPENSE.

The total of the superintendence and office expense account may be shown in one lump-sum figure. If detail is desired, a supplemental sheet may be used for it as described under "General property expense."

^a Possibly until the head accumulated during the repairing period has been exhausted.

^b Nothing is to be gained by charging each well with a part of "General expenses."

STORAGE AND SHIPMENT.

When a concern operates a dehydrating or cleaning plant to clean the oil it produces and maintains its own loading racks and shipping facilities, the storage and shipment account may assume sufficient proportions to warrant detailing. In such event a supplemental sheet, as described under "General property expenses," may be used.

BARRELS PRODUCED.

To segregate accurately the property production by wells is impractical, but approximate segregation is feasible and not difficult. Practically all pumpers compile a daily report which shows the hours idle, the cause of the idleness, and the estimated production of each well. If this estimated production is furnished the accountant, he can total each well's estimated output for a month, and by totaling the wells can determine the property output as estimated daily. This total when divided into the actual production for the same period, as determined by the method described in Chapter V, page 35, will give a percentage by which the well's actual total can be determined from its estimated total. The percentage may not be accurate, but the same chance of error applies to all the wells reported and the average obtained should be relatively accurate. The superintendent should be furnished with a copy of the data in order that he may efficiently supervise his work so as to obtain maximum production. Comparison of the monthly production of individual wells often results in the management sending a "why" to the superintendent.

CHAPTER XII.

CONDENSED BALANCE SHEETS, OIL ROYALTY, OIL ROYALTY EARNINGS, NUMBERING OF ACCOUNTS, AUTHORIZATIONS, PRELIMINARY EXPENSE, DRILLING OF FIRST WELL, UNCOMPLETED EQUIPMENT, OVERFLOW FROM DRILLING WELLS, UNSUCCESSFUL WELLS.

CONDENSED BALANCE SHEET.

The preceding chapters have dealt with balance sheets, profit-and-loss statements, and bookkeeping systems that apply mostly to companies operating only one property. The following chapter discusses the application of these subjects to companies operating more than one property. A condensed balance sheet for one property is given below.

Condensed balance sheet.

ASSETS.	
Capital:	
Real estate.....	\$565,872.10
Office equipment.....	2,462.65
Plant.....	469,158.78
Total.....	1,037,493.53
Less reserve for depreciation and depletion.....	413,722.00
	\$623,771.53
Current assets.....	88,716.84
Total.....	712,488.37
LIABILITIES.	
Capital stock.....	\$500,000.00
Current liabilities.....	40,072.18
Surplus.....	172,416.19
Total.....	712,488.37

If another property is added this form of statement will still hold good. "Real estate" should include all real estate owned; "plant," all the equipment on the properties, and "surplus," the combined profits less the dividends. All the other accounts specified refer to the concern as a whole rather than to individual properties, and it is not necessary to detail them into property units.^a As "plant" and other capital assets and profits, however, refer to individual

^a Depreciation and depletion charges depend on the method followed by the concern. They may be based on properties or on the total of capital assets.

properties it follows that detailing them may be required by the management. Then real estate and plant accounts may be divided by properties, and the details of each shown on a supporting statement. The same procedure will apply to the "profit and loss" statements. Therefore, a company that operates more than one property may express the condition of its business in a combined balance sheet, and may support this with several sheets giving the detail applicable to each property. The logical way for the accountant to compile a condensed balance sheet is to compile first the detail of each property, and then to combine all the detailed sheets into one.

OIL ROYALTY.

When properties are worked on a royalty basis, the operator surrenders part of the returns to the owners of the property or to intermediate lessors. The conditions of royalty, are, of course, governed by agreements and by the terms of the lease. The lessors may collect their royalty, based on the sales and settlement, from the operating company itself, or from the purchasers of its oil. Again, the lessors may take their royalty in oil, but this method is unusual.

Regardless of the method of settlement with the lessors, the accountant should record the amount of the royalty on the books. Assuming the royalty to be one-eighth, the lessor "John Doe," and the purchaser "Refining company," the entries shown below would be in order.

(1) If the concern collects eight-eighths from the refining company and pays John Doe one-eighth, the entry would read:

Oil royalty—Dr.....	\$1, 412. 72
To John Doe oil royalty account.....	\$1, 412. 72
<i>Explanation.</i> —One-eighth of amount charged to refining company for oil sales during June, 1918.	

(2) If the concern collects seven-eighths from the refining company and John Doe is paid one-eighth by the refining company, the entry becomes:

Oil royalty—Dr.....	\$1, 412. 72
To Refining company.....	\$1, 412. 72
<i>Explanation.</i> —One-eighth of value of oil sold refining company during June, 1918.	

By both entries "oil royalty" appears on the books as a debit. It may be treated on the profit-and-loss statement as a rental expense. Entry 1 places the John Doe oil royalty account on the books as a liability, and it stands there as such until payment has been made to John Doe, at which time the John Doe oil company account should be debited. Entry 2 credits the refining company so as to reduce its ledger account to a seven-eighths condition, and thus set forth the

true amount of the concern's account receivable from the refining company. When entry 2 is followed, no liability to John Doe appears upon the books of the oil company.

OIL-ROYALTY EARNINGS.

Should an oil concern lease property on a royalty basis to another oil concern, the lessor may reflect the revenue therefrom on its books under an account "Oil-royalty earnings."

On receipt of the lessee's advice, an entry should be made on the books of the oil company as shown below.

(1) If the lessee is John Smith who will collect from the refining company and pay the oil company the entry should be:

John Smith, Dr.

To Oil-royalty earnings.

(2) Assume the purchaser of John Smith's oil to be the refining company, which, by the agreement between the concern and John Smith, will pay the royalty to the oil company, the entry should be:

Refining company—Dr.

To Oil-royalty earnings.

NUMBERING OF ACCOUNTS.

Accounts should be numbered in order to facilitate their handling. If the account is a controlling account, the number of the unit and the number of the account are both written. For instance, if "Oil wells" is known as account No. 51 and well No. 3 is mentioned, the form of reference may be No. 3 A/C 51, or 3 A/C 51. All concerns that make large use of accounts number them. A list of the important accounts used in this publication and an account number for each follows. The break in numbers is to allow for expansion and to keep like accounts together.

Proposed system of numbering accounts.

ACCOUNTS.

OPERATIONS.

Account No. 1. Labor.

2. Supplies.

3. Water.

4. Fuel.

5. Teaming.

6. Miscellaneous.

Account No. 1. Pumping oil wells.

2. Repairs to oil wells.

3. Cleaning sanded wells.

4. Redrilling wells.

5. General property expenses.

6. Superintendence and office expenses.

7. Storage and shipment.

CLEARING ACCOUNTS.

Account No. 21. Power-plant operations.

22. General teaming.

23. General superintendence and office expense.

EQUIPMENT.

- Account No. 51. Oil wells.
52. Tanks.
53. Power plants.
54. Buildings.
55. Building equipment.
56. Oil lines.
57. Water lines.
58. Gas lines.
59. Horses and vehicles.
60. Tools.
61. Roads.
62. Telephone system.
63. Electric system.
64. Fire-protection system.
65. Sewer system.
66. Water system.
67. Reservoirs.
68. Oil-cleaning plant.

AUTHORIZATIONS.

When work of an unusual kind is to be done, many concerns request an estimate of its cost from their operating department. The executives approve this estimate, which is termed an "authorization," or "authority for expenditure," or has some similar title. When an authorization is drawn up it should state the account to which the work will be charged. Each authorization should be given a number, and the accountant should arrange to have the number specified on each charge against the work. Authorizations are generally for equipment work. When the detailed costs of equipment work are carried on the records the authorization number can be stated on the page containing the details.^a The system described in Chapter X, page 91, permits this.

An authorization record should be kept, and this should set forth the date, kind of work done, account, amount authorized, and amount expended. When a detailed statement of an authorization is called for, the accountant can use the authorization record as an index for locating the detail.

As the reader has probably gathered from the foregoing statement, even though several jobs coming under the same account should be authorized at the same time, a separate authorization should be issued for each.

PRELIMINARY EXPENSE.

On the assumption that the profit and loss of an oil concern begins with the production of oil, it follows that the expenditures prior to

^a See Form 28.

production are for the purpose of exploring the property. These expenditures may be put under the heads of "Property expenditures" and "Administrative expenditures."

Property expenditures in this instance cover the installing of the tanks, pipe lines, power plants, and buildings that when completed are used for the benefit of the first well drilled. All the property expenditures during the drilling of this well are therefore to be regarded as investment.

Administrative expenditures, such as office rent, salaries, postage, and stationery, that accrue during the drilling of the first well are less clearly of an investment nature. It is customary to charge them to "Preliminary expense."

The disposition of "Preliminary expense" is arbitrary and subject to the dictates of the directors. A conservative management will carry it to "Profit and loss" at the close of the first fiscal year or will prorate it over a period of years. To complete the drilling of a deep and troublesome well often requires a long time, so that "Preliminary expense" frequently amounts to a considerable figure.

DRILLING OF FIRST WELL.

Much accounting may be saved, when the first well is drilled on a property, by charging to the cost of the well all expenses connected with the equipment of the property, except those for roads, water system, buildings, live stock, and vehicles.

When the equipping of the well ceases, those items not a part of its completed equipment should be inventoried. The total should be credited to the cost of the well and debited to suitable accounts. The items should be priced at their value (based on the cost price) to the oil company as a going concern.

If this course is followed, the bills of purchase should be checked carefully in order that all the tools included therein may be accounted for on the inventory.

UNCOMPLETED EQUIPMENT.

As a comparison of assets and profits, as disclosed by the balance sheet and the profit and loss statement, furnish an index to the prosperity of the concern, it is often desirable, particularly when extensive developments are carried on, to classify separately the uncompleted and the completed equipment costs. Again, many concerns appreciate and depreciate some of their field assets according to the production obtained. When this is done, the investment in uncompleted equipment is eliminated from the calculations.

An account "Uncompleted equipment" is often used by oil companies in connection with the foregoing. This account may be used

only for compiling the balance sheet, or it may be carried on the ledger in order that a ledger balance may substantiate the appreciation and depreciation entries. In the latter instance the work on wells being equipped is charged to "Uncompleted equipment," and the cost of each well when completed is credited thereto. When this is done, "Uncompleted equipment" is a controlling account for equipment-unit data.

OVERFLOW FROM DRILLING WELLS.

Considerable oil often overflows from a well during its drilling period.

Some oil companies credit the value of the oil to the investment cost of the well. This procedure is not logical; the cost of completing the well should not be lessened by a revenue that is premature any more than by the revenue from the production after the well is completed. Other companies include the overflow value in either "Oil sales" or "Oil production." This is hardly correct, since the well is not on an operating basis, and the data for property production costs are upset. The shortest way out of the difficulty is to credit the value to an account entered as "Overflow from drilling wells" and to treat it as a revenue account. This plan may be modified to apply to a well at which experiments are made before being called completed by entering such production as is obtained as a credit to the cost of the experiments and carrying the net balance to the cost of the well.

UNSUCCESSFUL WELLS.

The loss incurred in drilling unsuccessful wells should not be classified on the balance sheet as a capital asset unless the method followed in computing depreciation provides for this contingency. If no depreciation is carried on the books, or if the depreciation charge for oil wells refers to successful wells only, the loss incurred through unsuccessful wells should be carried to profit and loss. The entire sum may be charged off at the close of the fiscal year or distributed over a period of years. If the sum is distributed, the portion not charged off may be carried under the account "Unsuccessful wells," which should be shown on the balance sheet as a deferred charge to profit and loss.

CHAPTER XIII.

DEPRECIATION AND DEPLETION.

The purpose of depreciation and depletion charges is to spread over the period representing the life of the assets the decrease in their value, in order that when the assets cease to have value a sufficient amount to represent either their first cost or the cost of replacing them will have been withheld from the profits.

Each barrel of oil extracted from a well reduces the amount contained in the property. As only a limited area of ground can be drained by each oil well, it follows that each barrel delivered brings a well that much nearer the end of its purpose. The asset value of property investments other than oil wells is also affected by the decrease in oil content, because the normal life of these investments may exceed the period of time over which profitable production may extend, with the result that the investments will be prematurely reduced to salvage value.

From the foregoing statement the reader will see that this decline in oil content underground has a bearing on the value to the operating company of all its assets, both its plant and its property. As a result the decline in the value of the assets resulting from production falls under three heads, as follows:

1. Decline in the oil content of the property.
2. Decline in the asset value of an oil well; this depends largely on the quantity of oil that the well can drain from the area tributary to it.^a
3. Decline in the value of plant assets other than oil wells; this is likely to depend more on the usage given equipment than on the decreasing oil content of the property.

The first item refers to depletion, the other two to depreciation. The foregoing statement indicates that either time or production may prove the best basis for calculating the amount that should be withheld from the profits to represent the decline in the value of capital assets.

DEPRECIATION.

Depreciation is considered to include the decline in value of all assets except leaseholds and real estate. Depreciation may be based

^a The decline in value of an oil well is due mainly to the decline of the oil in the underground reservoir drained; impairment or functional decay of a well is depletion.

on the use, value, and longevity of each of the separate units comprising the plant, or may be based on the plant as a whole. The former method furnishes a more satisfactory basis for an adequate solution of the problem. Among the several methods of computing depreciation are the two following:

1. Dividing the estimated life of the assets into equal periods and reserving a like proportion of their costs for each period.

2. Reserving for each period such a percentage of the cost of the asset as the benefit received during that period is estimated to be to the total benefit to be obtained.

Either method may be applied to the plant as a whole or to each separate unit. If the costs of the plant units are of record, it is obvious that the most satisfactory system is to apply the first method to assets other than oil wells and to apply the second method to the wells.^a

Under either system it is proper to change the rate of depreciation when the rate previously used proves to have been miscalculated. Under either system the estimated salvage value at the time of abandonment should be deducted from the cost, and the net result applied to the depreciation calculations. A conservative procedure is to underestimate the salvage value. Rates of depreciation are individual for each property. The rate at which the production of one well declines is rarely the same as that of its neighbor. The rate of decline for assets other than oil wells depends somewhat on the chemical contents of the soil and the atmospheric conditions of the district.

LEASEHOLD.

The outlay for leases, which comprises cost of acquisition, bonus, etc., represents an advance payment by the operating concern for the right to extract the oil from the property of the lessor, and the termination of the lease ends the privilege of the company to treat any part of its costs as an asset. Time is therefore a factor in the problem of reserving from the profits a sum to represent depreciation. Oil production also is a factor, because the time granted the lessee may be longer than would be required to deplete the property leased; then the depreciation need not begin before production is obtained and should not be extended over a period longer than production can endure. Again, the quantity of oil obtained from the entire property depends largely on the number of wells drilled, so that the production realized from such wells as may be operated during a

^a There are other methods of charging depreciation, but they are too refined for use in a business as highly speculative as the production of oil. Also, the writer does not favor including interest calculations in the depreciation problem of the oil producer.

certain period, as compared with the production expected to be realized from the entire property before it is surrendered to the lessor, may furnish a more equitable basis for decline.

When leasehold costs are small it is probably best to compute depreciation by the first method described under "Depreciation" (p. 111). Then the period of time granted the concern is divided into the costs of the leases, and the results are charged off in equal amounts and periods, regardless of the production obtained during each period.

When leasehold costs amount to large figures the property is usually not in the speculative stage. A large initial well may prompt the operating company to pay a large bonus. Then the first method of computing depreciation would be less fair to the profits than the second method.

Either method may be used to advantage in connection with leases continuing as long as oil can be produced in paying quantities.

DEPLETION.

Depletion refers to the decline in value of the investment in the oil property caused by the extraction and exhaustion of the recoverable oil. The problem is to determine the rate of depletion during certain periods of operation of a property. An accountant is hardly to be expected to be qualified to determine the depletion, but the following discussion shows in a general way the factors that have to be considered and some of the methods that have been used in charging off depletion.

Production represents depletion, but the rate depends on the percentage of the oil withdrawn as compared with the total amount recoverable. Production is a known quantity, and the problem of depletion therefore resolves itself into a determination of the recoverable underground supply.

A property may be assumed to contain a definite content of recoverable oil which when extracted is not replaced by nature. The quantity of recoverable oil depends on the geologic conditions and on the efficiency of the producer. Because these factors are variable and can not be calculated in advance with certainty, it is obvious that precise calculations of the recoverable oil are impossible. However, when conditions are favorable, fair approximations can be made by experts and often can be applied advantageously.

Of great importance in calculating the oil content are the natural conditions and the extent of the development on and adjacent to the property. A fully developed property, which has been producing several years and for which good records have been kept, will

furnish the most favorable data for reliable estimates. A property in an undeveloped territory, even though the geologic conditions may appear to be most favorable, provides little foundation for even a rough estimate. Estimates become less reliable in proportion to the lack of development. Regularity of the geologic conditions makes possible greater certainty in estimating recoverable contents; irregularity of geologic conditions leads to the greatest uncertainty in forecasting even the possibilities of a well to be drilled next to a good producer.

Because the rate of depletion depends on the total production to be obtained from the property, a calculation of the rate of depletion is just as speculative as is the calculation of the ultimate total production. In defining the depreciation of a property due to depletion, the values assigned should be reliable only to the degree of reliability that can be placed on the estimate for future production. The rate assigned should be conservative; that is, a high rate of depletion should be employed, and the more speculative the estimate of total production the sooner should capital investment be retired. The production of a well decreases rapidly in its early life, but more and more slowly in the later life; also, the major part of the total production is obtained in the early life. Consequently depletion charges should be high when the wells enjoy their greatest productions. However, if there is additional proved but undeveloped territory from which new production can be obtained that will make up for the declining production of the older wells, the early depletion charges need not be so high for the property as a whole.

Because of the difficulty of obtaining reliable estimates of future production, practices in the accounting of depletion have arisen that are not warranted in other industries in which such peculiar uncertainties do not prevail. Small producers in most fields east of the Rocky Mountains do not consider that profits have been earned until the capital investment has been returned and the "property has paid itself out." This view is, of course, usually ultraconservative. Other concerns rely on estimates of future production from their producing wells or from wells to be drilled on undeveloped proven acreage to carry a part of the depletion charges for the entire property; and, hence, only a certain proportion of the net profits of each year are applied to the redemption of the capital investment. This method is sound where dependable estimates of future production can be made, and is similar to the amortization of capital in mining concerns where bodies of ore have been blocked out by exploration work.

One method of estimating depletion, common in oil fields east of the Rocky Mountains, is based on "settled production." Settled

production is a relative term indicating that the sharp and irregular decline in the early life of the well has been passed and that production is declining more slowly and regularly. When this point is reached is largely a matter of individual opinion and judgment, and is not dependent so much on the actual production of the well as on the length of time it has been producing and its behavior. Developed properties are usually appraised or sold on the basis of an agreed price per barrel of the daily settled production.

Among the many methods of computing depletion charges are the following:

(1) To endeavor to "charge off" periodically a percentage of the investment in the property equal to the proportion of the mineral content withdrawn. This procedure requires a reliable estimate of the ultimate total production.

(2) To charge off periodically as much depletion as the concern can afford, until the existence of sufficient recoverable oil content has been proven to justify the charging off of the balance in accordance with the estimated recoverable content.

(3) To estimate the number of years during which the property may produce, and to reduce the property valuation in even installments on that basis. If this method is followed, it is advisable that conditions be such that production by new wells can be maintained for a considerable part of the estimated life of the property in order that each depletion charge will be made against an approximately equal production of oil.

(4) To divide the cost of the property by the number of barrels of "settled production," in order to ascertain the cost per barrel of "settled production," and to apply this cost to the current "settled production" in order to ascertain the worth of the property. The difference between the value so determined and the cost value is either appreciation or depreciation.

One should always remember that a concern owes its existence as a "going concern" to oil production; profitable production supports the value of the assets; unprofitable production reduces them to a salvage basis. The physical assets can be depreciated because their presence is tangible and their decay is evident, but their period of usefulness to the concern is governed by oil production.

CONCLUSIONS.

Some concerns combine both plant and property assets and appreciate or depreciate the sum according to current production. The method followed is similar to that described under "Depletion" as method 4.

If the production increases and the value placed upon it becomes greater than the investment in the property and the plant, there will be an appreciation of the book value, though depletion of the oil reserves and depreciation of the equipment have gone on continuously. As long as the value of production increases above the total capital investment there will be no depreciation or depletion charges reflected on the books. If the net profits from the oil produced after this point has been passed can not equal the capital investment the latter can not be entirely retired before the oil content is completely exhausted. This method does not take into consideration the fundamental fact that production represents depletion.

Where a partly developed property has been acquired, the price paid includes the bonus placed on the unit valuation per barrel of production in order to cover the gamble on the undeveloped part. By the time the property has been fully developed, this speculative element has been eliminated; hence, continuing a unit valuation that includes this bonus cost gives a fictitious valuation for the property as a whole. The same objections apply where the real estate cost of the property has been used in setting the unit valuation per barrel of production before the property has been fully developed.

Because the calculation of depreciation and depletion of every oil property is largely dependent on speculation, it follows that no set rule can be applied that is fair to all. In fact, it is often extremely difficult to arrive at a fair basis for any one property.

When depreciation is taken onto the books, either the asset accounts on which it applies, or a reserve account may be credited. The latter method is preferable because the books and balance sheets will always indicate the original costs of assets as well as the amount deducted from the profits to represent depreciation actually incurred. The entries would be as follows:

- (1) If depreciation is calculated on the plant as a whole:

Profit and loss, Dr.....	\$
To reserve for accrued depreciation.....	\$

- (2) If depreciation is calculated in terms of the controlling accounts:

Profit and loss, Dr.....	\$
To reserve for accrued depreciation—Oil wells.....	\$
Do. Tanks.....	\$
Do. Pipe lines.....	\$

(3) If depreciation is calculated on each plant unit. In this event the controlling account might be used in the entry, and the unit data that support the entry might be carried to the unit pages in the separate record, which contains the detailed costs of the units; or depreciation may be entered on the page of each asset unit in the

subledger, and the recapitulation of the subledger may be carried to "Reserve for depreciation" in one sum. Depletion should be taken care of by the following entry:

Profit and loss, Dr.....	\$
To real estate.....	\$

In the entries shown above, the account "Reserve for accrued depreciation" and the credit to the "Real estate" account represent the amount that is charged to "Profit and loss" to cover the amount of loss estimated to have been incurred in the conduct of the business. They therefore are treated on the specimen balance sheets as deductions from the assets on which they apply. They are not reserves to meet contingencies.

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